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AVIATION AND COSMONAUTICS

No 7, July 1988

Air Force Chief of Staff Discusses Staff Officer Training

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[Article by Col Gen Avn V. Pankin, chief of the Main Staff of the Air Forces: "The Headquarters Staff and Organization of Combat Training"]

[Text] Intensive work is in progress in Air Forces units and subunits to carry out the training curriculum plans and schedules for the summer period of training, directed toward further improvement in the level of combat readiness and job proficiency of military aviation personnel as well as high-quality mastery of modern equipment and weapons. The aggressive attitude and enthusiasm of personnel have been predetermined in large measure by the decisions of the 19th All-Union Party Conference. The very atmosphere of perestroika demands objective analysis and understanding of results of all work efforts in light of the missions assigned to the Air Forces and calls upon us more rigorously to evaluate what is being done today in the interests of strengthening combat readiness.

How does the headquarters staff appear through the prism of present-day demands? In particular, has combat training become the principal, determining element in the daily affairs of the headquarters staff? Functioning as organizers of the training and indoctrination process, Air Force unit headquarters staffs constantly and continuously concern themselves with intensification of this process, and first and foremost with an all-out improvement in the level of air combat proficiency and its core area—tactical air proficiency.

Changes which have taken place in military affairs have advanced to the forefront the need for assimilation and practical mastery of a number of new items. For example, fighting off a surprise enemy attack and conduct of combat operations in conditions of possible aggressor employment of precision weapons, integrated reconnaissance and strike systems and weapon systems.

Officers and general officers who are well trained and prepared both professionally and in an ideological-theoretical respect are serving on headquarters staffs of Air Forces units and combined units. At the present time almost all staff officers possess academy or specialized higher education. Each and every staff officer has a broad range of job duties. Each is constantly involved in performing complex job-related tasks.

The training process is well organized in the Air Force regiment in which Maj G. Kvartirko serves as chief of staff. This officer meets high standards of military competence and is an outstanding specialist. He exerts knowledgeable influence on the combat training of Air Force personnel and has set up effective monitoring of improvement in their level of professional competence. It is in large measure due to the efforts of the headquarters staff that an atmosphere has been created which stimulates active innovation on the part of all personnel and promotes high-quality conversion-training over to modern aircraft.

The end result of the work performed by the staff officers, however, is far from uniformity of excellence. The majority critically reexamined amassed experience, became more demanding on themselves and their subordinates, and waged a resolute campaign against phenomena of stagnation: complacency, unnecessary situation simplification in training, excessive attention to form with consequent detriment to content, and actions geared to show and pretense. Others are biding their time, merely going through the motions of advocating restructuring in combat training and in administrative activities, hoping that it will all blow over and things will go back to the old way. Unfortunately one encounters such an attitude in many places. This forces us to approach more rigorously evaluation of what has been done and accomplished and to learn to see behind the achieved results in combat and political training actual changes in people's thinking and psychology as well as moral and ethical reorientation of leader-Communists.

This is precisely how party members proceed in the regiment which this year was the initiator of socialist competition in the Air Forces. Personnel adopted a tough pledge: to shorten by 6 percent by the end of this year the time required to bring the unit to a state of combat readiness. The fact is that this is no simple task. And for this reason it was decided to discuss this important issue in all collectives. In the course of exchange of views and opinions, suggestions and proposals were made on seeking out reserve potential, and ways to reach the desired end result were specified. All this made it possible to achieve excellent performance results at subsequent tactical air exercises.

In this regiment they are vigorously combating complacency, lack of integrity, remissness and slipshodness. Following thorough study of the work methods employed by regimental chief of staff Lt Col V. Buchinskiy, he was held liable for party disciplinary action for heavy-handedness and tactlessness. The issue is formulated in simple terms: one must restructure not in words but in deeds. "There is no vague or general vanguard role for Communists," it was stressed at the 27th CPSU Congress. "It is expressed in practical deeds."

In their daily activities headquarters staffs are guided by the instructions of the USSR Minister of Defense and Commander in Chief of the Air Forces calling for bringing the training process as close as possible to actual combat conditions. Just what does this mean?

During the Great Patriotic War and the postwar period specific forms and methods of command and control of units and subunits became established in the Air Forces, forms and methods which in large measure have retained their value up to the present day. Today, however, staff officers must also consider new factors which affect the course of combat training: a sharp increase in quantity of diversified forces and assets taking part in combat, the rapid pace of battle, the spatial scale of combat operations, the intensity, fluidity and fast-moving nature of combat operations, as well as operational-level and tactical-level liaison with ground forces. In addition, in comparison with the past, today command and control is characterized on the one hand by an increased volume of assigned missions and greater complexity of missions, and on the other hand by limited time for accomplishing these missions.

In these conditions flight operations command, control, and support agencies must maintain the very highest level of readiness, which to a certain degree should run ahead of the overall readiness level of units and subunits. This is why it is essential that they be highly equipped and continuously be fully staffed with qualified personnel, and that communications facilities and electronic support services assets meet high standards of reliability. No less important are genuinely scientific organization of work activities at headquarters and proficiency by personnel in performing their job duties.

Staff work activities in support of flight training are substantial. They include constant knowledge of the environment and situation, prompt and timely preparation of data for the commanding officer for purposes of flight operations decision making, organization of air navigation briefing, air traffic and air performance monitoring at command and control facilities, arrangement of matters of coordination involving joint performance of missions with other units, plus many other items. Therefore the high demands imposed today on staff officers are quite logical: competence, a heightened sense of the new, and the ability to assume responsibility for solving complicated problems, promptly to take note of and support initiative by subordinates, and to mobilize personnel for successful combat operations.

The work performed by Air Force headquarters staffs requires constant improvement. Modern scientific research methods and means, directed toward thorough study and synthesis of the experience of the past war and the practical experience of command and staff exercises and tactical exercises, should be widely employed. There is considerable reserve potential in this area.

Experience indicates that wherever planning and scheduling of combat training is not approached in a predictable-pattern and unoriginal manner but taking into account actual conditions, realistic possibilities and the specific features of the tasks to be accomplished, high results are achieved. The situation is quite different wherever this is not done.

One should bear in mind that a plan and schedule is a mirror, as it were, in which the level of methodological proficiency of the training organizers themselves is clearly reflected, as well as their ability to foresee and assess different situation variants. Of course these qualities do not come immediately but as a result of painstaking daily effort, improvement of methods proficiency, competence in staff duties and management, and a high-principled and self-critical approach to evaluating one's own experience.

Planning requires considerable organizing ability and the involvement of all supervisor personnel. As we know, combat training is directly supervised by the commanding officer, while his staff organizes preparation of plans, schedules, and coordination of all services. As practical experience indicates, however, such coordination is not always observed, due to which consistency and system are frequently lacking in organization of combat training. Sometimes one encounters cases where commanding officers feel that planning is the concern solely of their staff officers. Wherever such an opinion occurs, problems with combat training are inevitable. Most frequently they are expressed in scattering of personnel and resources in organizing flight operations, in poor knowledge by superiors of the level of proficiency of their subordinates, and in lack of monitoring and verification of execution of adopted decisions.

In recent years staffs have worked a great deal on improving organization and methods of conducting commander training activities. A radical improvement in the state of affairs has not yet been achieved in all units, however. Frequently training activities are conducted using passive methods. In the course of various training drills inadequate attention is devoted to developing in officer personnel firm skills in performing job duties pertaining to command and control of personnel in the complex environment of today's combat and in improving their methods proficiency. And effective and efficient restructuring of this entire system is needed.

The presently-existing traditional group methods of conducting training activities (lectures, seminars, officer training drills, etc) should be conducted in the course of training drills or exercises within the system of political instruction, study of individual operational-tactical topics, military-technical and specialized training. These training activities are also planned and scheduled by the chief of staff or executive officer.

A large part of the allocated time should be used for officer training according to the plans and schedules of the appropriate chiefs of services and sections. It is necessary radically to change the directional thrust and methods employed in conduct of each training class or session and to study and improve those items directly handled by each officer involved in command, control and management activities both during peacetime training and when preparing for conduct of combat operations. Such an approach presupposes thoroughly

thought-out planning and a realistic increase in the responsibility of all direct superiors for the quality of training personnel in performance of job-related duties. This is impossible without initiative-driven, innovative development of training materials, including lectures, seminars, and classroom group sessions.

Training conferences are important for boosting the level of job performance by officer personnel. In preparing for such training conferences one should first and foremost thoroughly coordinate topic, training objectives and specific training items, and only after this should the theoretical and practical aspects be planned and scheduled. Frequently this is not done. As a result the theoretical part of a training conference includes training sessions which are not linked to the overall concept of its principal content—the practical part. This results in an activity lacking a common conceptual theme, with ordinary training classes devoted to study of individual commander training subjects, conducted sequentially over the period of several days.

Operational and combat training of units and subunits indicates that the theoretical part of a commander training conference should be planned and scheduled in two directional areas: with all officer personnel, and by training groups. At training classes with all officer personnel it is advisable to study new points and the most complex points of operational art, items connected with preparation for and conduct of combat operations, leadership and direction of units and subunits in performing the tasks assigned for the training year (period of training). For example, method, manner and procedure of battle planning, organization of coordination, command and control, all types of support, sequence and method of accomplishing combat training tasks, etc. As a rule this requires up to 30

of the total time allocated to a given training category. The rest of the time should be used for planning and scheduling classes by training groups. Their principal directional thrust is detailed examination of the most important items connected with the practical work activities of each officer. This should be the principal content of the training course. It is therefore very important to determine the form in which such training classes should be conducted, in order to achieve the stated objective and thoroughly to cover training topics.

In the headquarters elements of Air Force combined units, in our opinion the most acceptable form is the separate or combined staff training drill, depending on the level of proficiency of the command and control agencies, while the most acceptable form to use in units for command and control facility operating teams is the staff training drill and, for officers, warrant officers, and noncommissioned officers—command post exercises (tactical and specialized tactical drills) and drill sequences (training drills) by military occupational specialty area. The practical part of the training course

should also be used for working on topics pertaining to direction and leadership in the course of combat training (preparing work plans and schedules, draft reports on various topics, etc).

In developing organizational-methods materials one should devote particular attention to creating a complex and instructive operational-tactical environment, which must be coordinated in a general plan with the situation against the background of which operational-tactical training activities are to be conducted in the course of the training year. This method presupposes improving the efficiency and quality of the work performed first and foremost by large headquarters working out the tactical situation and coordinating matters of teamwork and cooperation, command and control, and all types of support activities in the course of forthcoming training activities for the personnel of units and subunits.

The summer training period is the most intensive for Air Force personnel. It is characterized by the highest intensity of flight operations, and particularly tactical training. This is also the period of greatest work load on headquarters staffs, which handle the bulk of organizational work pertaining to preparing for and conducting the majority of training activities.

Substantial changes have recently occurred in organization of pilot tactical training and specialized troops/rear services tactical training, which has had a positive effect on the combat proficiency of Air Force personnel and has made it possible to improve the level of readiness of command and control agencies to direct subordinate units and subunits in the course of combat operations.

At the same time unnecessary situation simplification in training, which is manifested in various forms, has not yet been eradicated. It frequently occurs that units resort to a "dual" approach in the conduct of tactical air exercises: a complex operational-tactical environment which is typical for actual combat conditions is created at the theoretical level, while practical performance of mock combat missions is done with situation simplifications, without involving all the elements of combat flying (penetration of air defense, target search in conditions of employment of EW).

It also sometimes happens that a mission is assigned to a unit or subunit several days prior to the day the actual mission is flown. This destroys the sense of urgency of the items being worked on at the exercise. As a rule neither increasing complexity of combat environment nor run-through of combat operations are prescribed.

Frequently various unrealistic simulation and compromise with realism occur in the dynamics of combat flying: limiting of low [200-1,000 m] altitudes and nap-of-the-earth flight or, on the contrary, limitation of very high altitudes [above 12,000 m] or altitudes reached by

generated momentum. There is no engagement of moving targets or targets beyond visual range, or work on simultaneous strikes by a subunit-size force.

Thus instead of taking a tactical pause in the course of a tactical air exercise and making sure that command and control facility operations teams and flight personnel are fully ready to carry out their assigned mock combat missions (and giving additional time for preparation when necessary), commanders and staffs are guilty of unnecessary situation simplification, eliminating actual performance of combat operations or at best running through operations according to a scenario worked out in advance, unjustifiably claiming concern about flight operations safety.

All this has a negative effect on the level of flight personnel job proficiency and tactical air proficiency of subunits and units as a whole and on their actual readiness to perform their missions.

An indulgent attitude on the part of higher-echelon commanders toward simplification of flight assignments at exercises has in a number of instances led to a situation where commanders and staffs of units and subunits have begun devoting greater attention not to the creation of a complex and dynamic environment at exercises, motivating exercised personnel to perform as in combat, but rather toward how to handle a given exercise activity as simply as possible, not always concerning themselves with meaningful results.

Due to poor methods training of staff officers, organizational-methods materials are poorly prepared for the conduct of basic combat training activities—staff training drills, command post exercises, tactical air exercises, and special tactical exercises. Frequently various tactical training activities conducted in the course of the training year or training period are not intercoordinated by a single general plan, environment, and objectives. And this has an adverse effect not only on the quality of preparation of organizational and methods materials but also on their implementation, since both exercised personnel, leader personnel, and higher headquarters as a whole must each time become familiarized with a new situation and tasks.

In order to raise the level of the organizational-methods material and to work on training topics in a single operational-tactical environment, some leader personnel plan and schedule the conduct of large-scale combat training activities: command post exercises with a number of units or combined units simultaneously. Practical experience indicates that in most cases this leads to poor results, since higher headquarters, proceeding from their capabilities, are unable to provide the requisite leadership and mediation. For this reason as a whole such a method cannot be considered useful.

Recently command post exercises conducted by Air Force combined units and regiments, with simulation of practical operations based on the battle plans produced by the exercised personnel, have been adopted in practical combat training. This opens up for headquarters staffs extensive opportunities for further intensification of combat training and for achieving better performance results without a substantial increase in material outlays.

The fact is that the range of addressed training topics and categories of exercised personnel broaden, and training activities become more dynamic and instructive during the conduct of such command post exercises. Personnel simulating actual forces must be more extensively utilized in practical operations. The greatest effect is achieved when subunits or units at full strength are used to simulate forces in a command post exercise with the exercise director designating a small part of units or subunits to actually perform a given mission. This increases the responsibility of commanders and staffs for decisions and battle plans and for high-quality execution of the entire aggregate of activities, and requires that they find the most efficient means of accomplishing missions and perform accurate, well-substantiated calculations.

Keeping undisclosed until a certain time the specific personnel to take part in actual operations compels exercised commanders and their staffs to work in a purposeful and specific manner on matters of coordination, command and control, and preparation of all flight personnel. Only this kind of work effort by leader personnel in subordinate units and subunits becomes genuinely useful. Increasing emphasis is being placed on command post exercises as one of the forms of combat training.

After-action critique and review of combat training activities and summarizing of performance results broken down by training periods are of great importance for increasing the effectiveness of the training process. Thorough, instructive analysis of the operations of Air Force personnel develops independence and aggressiveness, a self-critical attitude and sense of responsibility in these personnel. Commanders, political agencies and staffs should approach preparation for and conduct of such performance review and critique sessions with a high degree of responsibility. The slightest inaccuracy and casualness of attitude in presenting facts as well as excessively cutting and unwarranted judgment as a rule produce a negative reaction and diminish the instructional and indoctrinational significance of a training activity.

At the same time experience in line units attests to the fact that in many Air Force combined units and units headquarters staffs fail to devote adequate attention to this matter. Preparation of materials (exercise plan and schedule, reports, presentations, visual aids, etc) begins literally a few days before the scheduled training drill or staff meeting. Of course in such cases they cannot

possibly be of instructional benefit. Everybody knows that performance results are determined at a staff meeting. This form of procedure calls for exchange of views on basic issues, that is, active officer participation in discussing combat training results. Quite frequently, however, at such meetings, even at the squadron level, one does not hear anything from the flight and detachment commanders or maintenance group supervisors.

Analysis of organization of combat training during the summer training period in many units persuasively demonstrates that wherever commanding officers guide and direct the training of their staffs, wherever they clearly formulate tasks and verify their execution, wherever the microclimate, as they say, is good both on the staff and in the command structure as a whole, the quality of planning and organization of combat training in subordinate units and subunits is better. And on the contrary, wherever there occur uncoordinated actions by the commanding officer and his chief of staff or executive officer, wherever command and control agency training is poor, there is lacking proper organization of combat training, which has a substantial effect on combat readiness of the unit and subunit.

Principal reserve potential to boost the effectiveness of combat training should be sought first and foremost in the command and control activities of headquarters staffs at all echelons. If staffs operate in a knowledgeable, efficient and precise manner, units and subunits will have a high level of combat readiness.

Our military doctrine is purely defensive. We have declared to all mankind that never, under no circumstances whatsoever will we initiate military operations against any other state unless we ourselves are subjected to military attack. Consequently we must maintain a high level of vigilance and constant combat readiness. The role of the headquarters staff and efficiency of command and control have increased immeasurably. This means that the entire cycle of training and preparation for combat operations must be carried out in a minimal period of time in order to ensure that our counterattack is lightning-swift and devastating to any aggressor.

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Air Force Political Official Urges Full Acceptance of Perestroyka

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[Article, published under the heading "Implementing the Decisions of the 19th All-Union CPSU Conference," by Maj Gen Avn V. Makeyev, chief, Propaganda and Agitation Department, deputy chief, Air Forces Political Directorate: "New Approaches in Ideological Support of Perestroyka"]

[Text] Last year a frank, meaningful discussion of problems dealing with restructuring of ideological work in the

Air Forces began on the pages of the journal AVIATSIYA I KOSMONAVTIKA. In summarizing the results of this discussion, I would first like to say the following. Last year was of great importance for implementation of the party's strategy aimed at accelerating this country's socioeconomic development and achieving a new qualitative state and condition of Soviet society.

The phase of analysis of the goals and tasks of perestroyka is now complete, and the second phase has begun—a phase of vigorous actions to implement specified plans and programs. The decisions of the June (1987) and February (1988) CPSU Central Committee plenums and preparations for the 19th All-Union Party Conference have done a great deal to help strengthen in party organizations and military collectives a spirit of social optimism, faith in perestroyka, and people's aspiration to speed up the process of positive changes by their labor.

A mood of readiness to perform concrete deeds is becoming increasingly evident in the combat training and ideological activities in Air Force units and subunits. Responses to the article "Ideological Work: A Time of Restructuring" received by the editors of this journal are permeated with this mood. First and foremost, in these letters one can feel a concern to ensure that the mechanism of ideological effect corresponds maximally to growing demands on combat readiness, military proficiency, moral-political and psychological conditioning and fitness on the part of military personnel, and on the whole the task of forming new political thinking in Air Force personnel. Bold critical analysis of shortcomings and specific suggestions and proposals aimed at improving the system of ideological indoctrination work attest to the fact that the problems raised in the article and the very subject of the discussion on the pages of this journal have not left readers indifferent.

I believe that this is very important. Why? I shall answer that question by quoting the author of one of the responses, Lt Col V. Fedotov: "You can experiment and search as much as you want, but if the propagandist's heart remains cold, one can scarcely expect any changes for the better."

Practical realities and the practical experience of ideological work in the Air Forces convince us that already today the majority of people working in this critical sector are working with enthusiasm. Precisely for this reason the process of search for a better design and structure of the edifice of ideological work, to judge just by letters from readers, is gathering momentum.

Letters from Air Force units and party organizations in the Soviet Far East, for example, report that changes for the better have been noted in the ideological domain in that area, that bits of positive experience have been amassed, and that a good backlog of accomplishment is being established for further advance in these efforts.

Maj E. Akhmetov notes that an innovator spirit is penetrating increasingly deeper into the system of ideological support of alert duty and military aviation personnel combat training.

At the same time the authors of many letters express concern at the slow pace of perestroika and name the causes of delay and ways to eliminate them. In the opinion of Maj S. Koroteyev, G. Nachmetdinov, Ye. Urazov, and other participants in the discussion, it is essential to free as quickly as possible ideological work as a whole and political instruction of military aviation personnel in particular from excessive attention to form with consequent detriment to content, uncritical mechanical rote learning, and boring didacticism. Not all Communists, including leader personnel, have fully mastered theory of perestroika. Ignorance of the tasks and methods of accomplishing them engenders passivity and voluntarism. I also agree that many ideological workers are not working in the new way and are not striving to do so. This attitude leads to our propaganda and agitation becoming separated from practical realities and people, and it diminishes the effectiveness of indoctrination effort.

I do not believe that discussion of these problems in this journal requires detailed commentary. Since the deficiencies are evident and we essentially know how to combat them, we must rectify the situation as quickly as possible and by common efforts.

The discussion of restructuring of the forms of ideological work has been lively indeed. Interesting thoughts and suggestions are contained in letters from Col P. Fedorov, Gds Maj S. V. Donetsk and Yu. Ostanin, Maj S. Ye. Urazov, I. Drobinka, and others. An important element is the fact that, as they enthusiastically advocate the adoption of active forms of political instruction and indoctrination, such as lectures and seminars focusing on a problems approach, etc, or advocating the infusion of new content in traditional forms, many letter authors have backed up their position with persuasive examples of actual current experience involving such work in units and squadrons.

Some statements could be challenged. In some letters readers complain that the system of ideological-political indoctrination is too unwieldy, is rigidly regimented, and inhibits the independence of political workers and ideological activists. It is true that the system is not yet ideal. But I do not think that it is entirely correct to blame the system for all ills. The problem lies rather in the inadequate competence, facility and flexibility on the part of persons responsible for this area.

Local political agencies and party organizations are given the authority in large measure to determine for themselves what resources and manpower are to be used to accomplish the ideological tasks assigned by the party Central Committee. It is another thing altogether that many people do not yet know how to use or do not want

to utilize this independence. But the road to correcting the shortcomings and deficiencies engendered by old views and habits lies through new thinking and new approaches to ideological-political indoctrination of military aviation personnel.

One can only be pleased at the debate nature of the discussion, because prior to defending one's opinion it is necessary at least to have an opinion. We also know that truth is born in debate. An editorial appearing in the newspaper PRAVDA entitled "Principles of Perestroika: The Revolutionary Nature of Thinking and Actions" notes that argument, debate, and polemic are necessary. They lie in our future as well. There also lie ahead many roadblocks mined with the past. We must all work together clearing these mines. We need debates which help move perestroika forward, which lead to consolidation of forces, toward solidarity behind perestroika, not toward disunity.

If the discussion has moved us even one step forward in this direction, and I believe it has, then it has unquestionably been useful and necessary. One can merely express regret that our volunteer propagandists have not participated much in it. There also could have been more specific suggestions and proposals.

At the same time I assume that this will not be the last discussion of this kind and that the journal will in the future continue to address current problems of restructuring of ideological indoctrination activities.

As already noted, the year which has passed since the article "Ideological Work: A Time of Perestroika" appeared has accomplished a great deal in the area of deeper analysis and understanding of program tasks and ways to accomplish them, as well as ideological support of the process of positive changes both in society as a whole and in our Air Force units.

Viewed through the prism of the demands of new party documents which have been issued during this time as well as amassed experience and know-how, it is much more apparent where and in what we have been deficient or are deficient and in what direction we should proceed in the future.

It is clear right today that one of the reasons for deficiencies in organization and, as a consequence of this, poor effectiveness of ideological work lies in a narrow definition of its essence and substance. Some commanders, political workers, party and Komsomol workers, regardless of their intentions, end up reducing the system of ideological influence solely to political instruction, political briefing, and lecture propaganda.

I should remind the reader that ideological work presupposes thorough mastery and innovative development of Marxist-Leninist theory, extensive dissemination and

vigorous clarification to personnel of the points of revolutionary teaching and organizational activity pertaining to its implementation. The mechanism of ideological influence is capable of producing maximum effect only in a close unity and interaction of all structural elements.

In practical terms this is achieved by influence exerted on the consciousness of military aviation personnel by the system of independent study, political training in all its forms, mass agitation and cultural-enlightenment activities, lecture propaganda, ideological-political, moral and ethical, legal, and other categories of instruction and indoctrination, under the condition of a comprehensive, differentiated approach to each category of military aviation personnel.

Practical realities insistently demand acceleration of changes in all domains of combat training, administrative and support activities. Restructuring of ideological work should enjoy a priority status, since the contribution of military aviation personnel to the process of renewal depends in large measure on the level and depth of their consciousness and awareness. Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, noted in his address at the February (1988) CPSU Central Committee Plenum that it is essential to accomplish the tasks of perestroika in order maximally to stimulate people's initiative and independence, to overcome their passivity, their drabness of civic expression, their apathy and lack of independence of thinking—these direct results of a bureaucratic style of leadership. One must be clearly aware that impeding forces also exist in the spiritual and intellectual domain, perhaps even more powerfully in this domain than any other.

Mere general knowledge and conduct of ideological work is not sufficient today. It should be adequate to the party's policy of perestroika, which requires deep, thorough study of theory, methodology, and experience of ideological indoctrination activity. Program points and practical recommendations are contained in the documents of the 27th CPSU Congress and of party Central Committee plenums, in speeches by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, on ideological issues, in his book "Perestroika i Novoye Myshleniye Dlya Nashey Strany i Dlya Vsego Mira" [Perestroika and the New Thinking for Our Country and for the Entire World], and in speeches and statements made by other party and government leaders and military commanders.

At the same time many of our ideological workers and activists are not familiar with the points and demands contained in these documents. For this reason they are acting blindly and ineffectively, one might say. One should not work that way today.

All of us must work persistently to form and shape new political thinking and to master new approaches toward accomplishing the missions assigned to the Air Forces, as

well as ideological support and accompaniment of these missions. Excellent end results in strengthening combat readiness, military discipline, and improving flight safety should constitute points of reference in the activities of each and every military aviation unit, party and Komsomol organization, each and every pilot and all Air Force specialist personnel. We must bear in mind that tiny, insignificant additions and nudges represent an extensive rather than intensive path of building up the moral potential of Air Force personnel. It produces nothing. It is for this reason that we talk about the need for vigorous, results-producing search, leading to the creation and development of an improved, more effective mechanism of influencing the human factor.

Consequently ideological work must be restructured more vigorously, across a broad range, and mandatorily linked with the realities of life and practical military activities. In order to ensure such a linking, it is important to possess good knowledge of the essence and substance of ideological work, the arsenal of its forms and methods, the degree to which they correspond to present-day conditions, their effectiveness, the advisability and expediency of continued application, further development or rejection of given forms and methods. The point is that we need a high level of ideological competence on the part of leader personnel, party and Komsomol activists, and all party members.

How is it to be achieved? In large measure by independent study of theory and methodology of ideological work, by organization of universal primary ideological instruction on the basis of universities of Marxism-Leninism, and especially their propagandist faculties, reference-information centers, political self-instruction classes, and social sciences departments at Air Force higher educational institutions.

Political agencies and staff ideological workers should serve as organizers of this mass educational process. They should be greatly assisted by the social sciences departments at higher educational institutions. Recently, for example, they have prepared 35 different pamphlets on current issues of CPSU theory and policy, at the request of the Air Forces Political Directorate. The higher educational institutions also have other published materials at their disposal. Unfortunately it sometimes happens that such books and pamphlets are gathering dust in cabinets and on shelves at political section offices and do not reach military aviation personnel. This is intolerable.

We should also like to draw attention to the following. Today the emphasis in ideological work should be placed on agitation by word and deed. It is important to achieve maximum individualization of word-and-deed agitation, a directional thrust aimed at specific individuals and a specific unit—flight, detachment, company, or squadron. The fate of training curriculum plans and schedules and the missions assigned to the Air Forces is decided

precisely at this level. Task accomplishment results depend on the degree of conviction and practical contribution on the part of each and every military airman.

Today it is simply impossible to live and work guided solely by short-term interests. We must learn to look far into the future, to forecast and predict ideological work and its influence on the basis of a comparative analysis of the achieved level of unit (subunit) combat readiness, flight safety, discipline, and future tasks pertaining to their improvement. From this proceeds the necessity of establishing specific, comprehensive ideological work programs or, even more accurately stated, programs of ideological support of current tasks facing Air Forces units, as well as future tasks extending to next year, two years hence, and further into the future.

The propaganda and agitation department of the Air Forces Political Directorate has drawn up programs which encompass the ideological work system as a whole, political training of personnel, lecture propaganda, cultural and educational work, plus a number of other areas. Most of these have already reached political agencies.

It is important to ensure that all ideological workers and activists take active part in ideological support of the tasks of the second phase of perestroika. There should be no pauses, lapses or omissions in ideological influence. It is essential to raise its level day by day, to expand and broaden the frontage of influence, to ensure that conviction, knowledge, experience and know-how on the part of military aviation personnel are manifested more rapidly and with greater results in their military labor and that they work to promote perestroika.

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Bomber Regiment Conversion-Trains Without Manuals or Training Support

91440073c Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 6-7

[Article by Lt Col N. Antonov and Maj A. Zhilin: "Mastery of New Equipment—Foundation of Combat Readiness"; first five paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] AVIATSIYA I KOSMONAVTIKA Field Team Investigates a Problem

This Red-Banner guards bomber regiment once flew SB bombers in an airshow in the skies above Moscow. Subsequently the most proficient aircrews fought the White Finns.

During the Great Patriotic War the regiment's aviators took active part in almost all major combat operations. During this time the regiment conversion-trained over to Yer-2, LB-3, and DB-3f (Il-4) aircraft, while maintaining its level of combat operations.

From 1941 through 1945 the men of this regiment flew 8,540 sorties and dropped approximately 9,000 tons of bombs on the enemy. Thirteen airmen were awarded the title Hero of the Soviet Union, and many others were awarded medals and decorations for courage and valor displayed in combat against the German-Fascist invaders.

In the postwar years the men of this regiment successfully mastered new-generation aircraft, strengthened their combat readiness, and improved their level of proficiency.

Difficult tasks face these guardsmen-aviators: to shorten the time required to bring the regiment to a state of combat readiness, high-quality mastery of modern missile-armed aircraft, and maintaining flight safety at a high level (incidentally, the regiment has had no air mishaps in the last 20 years). All this demands of commanders, political workers, the party organization, and all personnel acceleration in surmounting problems which arise, new approaches and a new level of thinking in the spirit of the decisions of the 19th All-Union CPSU Conference. The following articles discuss how the regiment is improving combat proficiency and surmounting difficulties [only the first of the two articles has been translated].

Coordination—Key to Success

The air force base was bathed invitingly in the caressing golden rays of spring sunlight. Spring was in full bloom—a time to clean out all the old and obsolete, a time of practice alerts and a time of hopes.

For more than a year now the outfit under the command of Military Pilot 1st Class Gds Maj A. Medvedev has been engaged in a "spring cleaning" campaign. The military airmen, swinging the sword of selfless labor, have been endeavoring to cut the Gordian knot of difficult problems connected with conversion-training over to a new aircraft. But up to the present time the sword has proven to be insufficiently sharp, or else they have not been strong enough to swing it properly. In any case, rather than slashing asunder the complex interweave of difficulties, they have been forced patiently to untangle it. But time is marching on, bringing new problems.

Regimental commander Gds Col V. Grebennikov did not appear very chipper when we met him. There was tiredness in his eyes. This was evidently the result of sleepless nights thinking about how to help Medvedev's subunit get through its difficult situation. The enormous moral-psychological stresses experienced not only in the sky but on the ground as well, plus the heavy burden of responsibility for performing a mission of national importance have left their mark.

Perhaps it was for this reason that Vladimir Dmitriyevich at first seemed to us to be an introverted, untalkative, even harshly stern individual. It was only later, when we got to know him somewhat better, that we realized that the point was not introversion but rather an extremely busy schedule and considerable preoccupation. He had no time for extraneous conversation about the difficulties of perestroika (today a favorite topic for a certain category of commanding officer). Every minute is worth its weight in gold, as they say. He must constantly think and act, act and think, in order to accomplish this very restructuring in a practical manner together with his subordinates, so that concrete results of the unit's labor can be seen not in the distant future but today, tomorrow, and the day after.

Grebennikov is an experienced commander and clearly understands that hope of successful accomplishment of tasks and doubt about the possibility of accomplishing them rapidly and with high quality cannot long exist side by side in people's consciousness. An implacable struggle is going on between these categories, and the result will be had if doubt prevails. From there it is only one step to social apathy.

Such far from joyous thoughts are troubling Vladimir Dmitriyevich, and there are reasons for this. Take, for example, Gds Maj A. Medvedev's subunit. It finds itself in a difficult situation, to put it mildly....

Consider the following situation. Succumbing to an advertising sales pitch, you decided to buy a new car. And now this wonder machine is in your possession. You can start learning how to drive it. It turns out, however, that the manufacturer did not feel obliged to provide you with an operating and servicing manual. But you have no recourse: the deal is done, you can't take the car back, and you have started the painful job of mastering its operation and servicing procedures blindly, so to speak. Somehow figuring out how to make the thing run, you slip behind the wheel.

But don't be too hasty in your joy! After your third spin, the car develops a problem. By the time the factory mechanics get around to correcting the problem, naturally you will have totally lost those meager driving skills you managed to acquire, and you are tortured by awareness of the fact that you will have to begin again right from the beginning.

The main drawback of such situations lies in the fact that they take away precious time from all of us and involve additional emotional stress and physical exertion. And this of course does not promote improved quality of labor.

One draws an obvious conclusion from the above: we must vigorously combat such phenomena; it is high time to call strictly to account those officials who are guilty of a lack of principles and integrity.

Anyway, enough of these abstract pictures generated by mental speculation. Let us state the question in specific terms: why is it that an Air Force unit, the personnel of which have proceeded to conversion-train over to a new aircraft, has encountered problems many of which could have been avoided in advance? I believe that the reason lies primarily in the fact that tasks which are essentially new and in keeping with the spirit of the time continue to be accomplished by old methods. Last-minute rush work to meet quotas, voluntarism in planning, totally unwarranted exploitation of people's enthusiasm, and other attributes of the period of stagnation continue to be in evidence.

At the highest Air Force administrative echelons conversion was scheduled in such a manner that new aircraft arrived at the subunit before proper training facilities and resources had been provided which were capable of ensuring high-quality study, operation and maintenance of this complex aircraft. Apparently this was once again the phenomenon of detrimental emphasis on churning out reports: someone was in a hurry to report accomplishment, without considering the consequences of pushing events faster than they could be pushed. And the consequences proved rather serious.

"We began conversion-training over to the new aircraft," stated regimental senior navigation officer Gds Lt Col I. Anikin, "having in our possession neither combat training course materials nor a single training flight program or model. We had to devise everything ourselves, working from bare ground, so to speak. This resulted in extremely inefficient use of precious training time, the short supply of which is felt very strongly during a conversion-training period even without these problems. At the same time they have not exempted us from the responsibility of maintaining the unit in a continuous state of combat readiness. If to this one adds that we are operating three different aircraft simultaneously, one can easily understand how difficult things are for all concerned."

Military men.... Honor and praise to them for their selflessness and dedication to service, their readiness and willingness totally to subordinate their personal interests to the tasks of ensuring the security of the homeland!

Aware that the new equipment requires solid knowledge of theory and a high degree of professionalism, the airmen are working to their utmost. The term "workday" is probably inapplicable to them at the present time. Sometimes 24 hours in a day is simply not enough. Navigators S. Trofimov, V. Podoprigin, V. Yengalychev, O. Poletov, A. Ovchinnikov, and V. Adamov, working under the guidance of Gds Col V. Yegorov and Gds Lt Col I. Anikin, put together bit by bit, working from specification and technical data sheets, gathered information on crew operating procedures for the new aircraft [raketonosets—jet-propelled combat aircraft carrying or capable of carrying missiles]. The recommendations they synthesized and assembled in systematized

form were subsequently communicated to all personnel. In the absence of manuals of operational procedures and specialized literature, personal outline notes became the principal assistance in training personnel.

"The most difficult thing for flight personnel during conversion-training," officer I. Anikin shared his thoughts, "is to gain a thorough understanding of the 'ideology' of the new aircraft. At the present moment this applies particularly to us navigators, because right now each aircraft navigator has to work out for himself a procedural flight plan for each training mission. Considerable variations in our procedures are also introduced by the specific features of employment of the aircraft's armament and weapons delivery as a whole. All this increases by several orders of magnitude the demands imposed both on knowledge of theory and on the practical proficiency of specialist personnel. We lack, however, the proper conditions needed today for training highly-proficient navigators. We have no training simulator, and we have no portable computers. We don't even have a decent navigator training classroom provided with modern equipment. And all this because there is lacking a smoothly-running, properly-organized system of centralized supply of textbooks, training manuals and training aids to the units. The impression is created that the aircraft industry and a few others have only one concern: moving aircraft out the factory gate as fast as possible, and they don't give a damn about anything else. Quite frankly, you don't get the feeling that they are doing the slightest perestroika.

"We are also concerned by such problems as change in the table of organization structure of the subunits conversion-training over to the new aircraft and improving supply of textbooks, manuals, training aids, and equipment to the unit. Our housing problem is also now more acute. We are unable to cope with these difficulties with our own manpower and resources."

During the course of conversion-training, large and difficult tasks faced the regimental aviation engineer service, headed by Gds Lt Col Ye. Ignatov. Working in parallel with the development of training facilities, the aviation engineer service people were thoroughly studying the design and operation of the new systems and components as well as operating and maintenance procedures. Officers Ye. Ignatov, A. Shakiryanov, S. Rymarev and others accomplished the immense job of setting the training process on its feet proceeding strictly from available resources and capabilities. We should note that the regiment's aircraft maintenance engineers contributed a great deal toward conversion-training not only of ground maintenance personnel but flight personnel as well. One can state with confidence that the difficult tasks facing the aviation engineer service are in large measure being successfully accomplished because Gds Lt Col Ye. Ignatov and his aides have succeeded in establishing a team of people of like mind and conscientious workers.

The regimental deputy commander for aviation engineer service and the specialization area engineers keep a constant eye on the quality of training classes and make sure that they are conducted in a lively and interesting manner. The following form of training has proven quite effective in the subunit, for example. An engineer presents a lecture to the men, and that maintenance specialist with the highest degree of practical proficiency explains and demonstrates on the spot how specific maintenance procedures are to be performed.

In order to ensure better assimilation of the training material, a seminar is held following each lecture. This is done as follows. The training instructor prepares a list of questions which the trainees have brought up, after which the men work together to find answers. Training drills conducted at the airfield, on aircraft maintenance days or at times when flight operations are cancelled due to weather, are highly beneficial.

The problem of protecting ground maintenance personnel against the harmful effects of loud noise generated by airfield service vehicles, and especially aircraft engine noise, is a critical problem being addressed by engineers and technical personnel. Many officers have been complaining that this matter was not addressed in a prompt and timely manner by the appropriate specialist personnel. As a result the ear protectors at the airmen's disposal proved to be little effective, and bulky and inconvenient to boot. This problem must be solved without delay, for the most precious thing—the men's health—is at hazard. The editors are hoping to receive a constructive response from the appropriate officials about what specifically is being undertaken in this regard.

In analyzing the problems encountered by Air Force personnel (not through their own fault) in the course of mastering operation and maintenance of a new aircraft, we must say that any new undertaking begins with difficulties, for each individual and for the entire outfit as a whole. Therefore, by the very logic of things, the more complicated and critical the task facing an outfit, the more smoothly coordinated the attack on these problems should be, both from above and below.

The headquarters staff headed by party member M. Soroka is rendering considerable assistance to the regiment. Staff officers are endeavoring to support the airmen not only with words but with deeds as well. One can state without exaggeration that, thanks to their efforts, many critical problems which faced the regiment have now been resolved. Nevertheless we must note that there are some problems which must be solved at a higher level.

This lack of balance of efforts leads to a situation where the regimental commander and his deputies are forced to go around begging, haunting the reception rooms of civilian establishments, organizations and offices, trying to obtain building materials, for example. At times they must resort to the pernicious principle of "you scratch

my back and I'll scratch yours." The saddest thing about it is the fact that quite frequently this is confused (by accident?) with the currently popular concept of socialist enterprisingness. If a commanding officer has managed to make something out of nothing, they would say that he is a contemporary leader.

Unquestionably a regimental commander needs socialist enterprise and initiative. But it also goes without question that there should be reasonable limits to everything. It is one thing, for example, to build a heated greenhouse with one's own resources, but it is quite another thing altogether to build by hook and by crook a training simulator building which costs a great deal of money. In our opinion what we have here is an attempt by various officials to conceal old working methods with the phraseology of modern wording. This is not restructuring of one's work style but rather propping up of the old....

"What can I tell you? We have plenty of problems," Gds Col V. Grebennikov told us. "But the men are not losing their confidence that these problems will be surmounted. Suffice it to say that at the present moment we have achieved everything specified by our plan. I feel that a good deal of the credit must go to the party organizations and party committee, which ensure aggressive enthusiasm on the part of the men and mobilize personnel to conquer the heights of combat skills."

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Air Force General Comments on Problems With Perestroyka

91440073d Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) p 9

[Commentary on AVIATSIYA I KOSMONAVTIKA field team article, by Lt Gen Avn P. Deynekin: "Seeking Reserve Potential"; commentary on preceding article]

[Text] The problems examined in the materials dealing with mastering new combat equipment have always been of current relevance and today have taken on particular urgency. The fact is that the very latest advances in aerodynamics, astronomy, electronics, metallurgy, chemistry, medicine, cartography, optics, etc should be embodied in today's aircraft. This is not always the case, however. Sometimes paradoxes occur which are incomprehensible to the military man.

For example, a certain aircraft lacks an auxiliary power unit (VSU), as a result of which it lacks such an important characteristic as self-sufficiency [from ground equipment]. Another aircraft has an APU, but lacks a track corrector, which on an extended flight could determine the aircraft's location with the requisite degree of accuracy. And yet today the question of accuracy of air navigation is a question of war and peace, one might say.

In addition, to use the authors' automotive terminology, one might state the situation as follows: one organization orders and purchases a car (of course at government expense), an organization which, incidentally, is not responsible for how it performs out on the road. Others must pay for the indifference and mistakes of the procuring agency.

As you will recall, in his book entitled "Nebo Voyny" [Skies of War], A. Pokryshkin described how the compressed-air tank hose adapter fit the MiG-3 line fitting but did not fit the one on the Yak-1. Today you cannot manage merely with a compressed-air tank to service a modern aircraft, but the principle of individual uniqueness of function of a great deal of ground equipment fitting only one specific combat aircraft remains firmly established.

This happens because science, industry, procurement agencies, and their activities are evaluated by all kinds of criteria but the main one—readiness of an aircraft to do its job.

The above does not mean that we shall simply sit and wait for perestroyka to take place on its own. Both here and in the unit under the command of Gds Col V. Grebennikov, unit methods councils, headquarter staff, and party committee are working at full effort. I should like to make particular mention of the aggressive enthusiasm on the part of the regiment's party organization. Practical activeness on the part of party members, combined with concern by Air Force command authorities with improving the situation, convinces us that tasks will be successfully accomplished.

Today it is still possible to solve the problem in the old way, spending twice the amount in terms of the human factor (enthusiasm and patience), but tomorrow this old way could let us all down hard.

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Reader Letters Reveal Problems in Line Units

91440073a Moscow AVIATSIYA I KOSMONAVTIKA
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[Article, published under the heading "Following a Policy of Perestroyka," by Military Pilot 1st Class Maj A. Khudoyash, squadron executive officer, and Maj I. Pavlov, deputy commander for political affairs of a separate airfield technical support battalion: "Injection Against Inertia"; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] How Is a Combat Model Constructed? Is Objective Verification Obvious? Material Incentive Is Needed. Work and Play in the New Way

The decisions of the 19th All-Union CPSU Conference encourage activeness by Air Force personnel both in volunteer work and in job-related activities. This is also apparent from the editors' mail. In their letters our readers do not limit themselves, as in the past, to enumeration, for example, of deficiencies in combat training, but seek out and propose ways to correct them. Such negative phenomena as social sluggishness, parasitism, complacency, and the endeavor to substitute pretty words for concrete deeds are yielding under the onslaught of growing initiative.

We publish below a selection of reader letters which raise important issues.

Working Together—Maj A. Khudoyash

What will tomorrow bring for the Air Force unit? Probably every officer has asked himself this question. The accelerated pace of our time and the complexity of the tasks performed by flight personnel, engineers and technicians compel us to take a new look at the established structure of combat training and point to the need to find and maximally to utilize reserve potential for improving the quality and effectiveness of military labor. I would like to share some observations in this connection.

Today there is a great deal of discussion about the need to attain full conformity between the nature of combat training activities and the conditions in which they are carried out. The discussion is primarily about progressive methods and improvement of training facilities and equipment. What is the most significant thing in this discussion pertaining to the Air Force unit?

In our regiment we recently analyzed experience in the conduct of maneuver air-to-air combat engagements and reached the conclusion that there is a possibility to broaden the framework of one of the established combat maneuvering schemes. This requires employing a new maneuver for that particular combat scheme, preliminary calculations of which hold the promise of a tactical advantage over the potential aggressor. As we know, any idea requires well-defined theoretical substantiation, which is grounded on rigorous mathematical criteria. Unfortunately, this cannot be accomplished with pencil and paper. Data on airspeed, load factors, and angles of attack can be worked up only on a computer. In short, we were unable to check our preliminary calculations.

Some people might say that this is a particular, specific case, which does not merit an extensive debate. Absolutely false! Everything which diminishes combat readiness negatively affects military proficiency—this is not a particular instance and it is not a trifling matter, since it places in jeopardy something that is sacrosanct—the defense capability of the homeland. I believe that we should examine precisely from this standpoint the problem of providing Air Force units and subunits with computers and sophisticated training systems.

Take simulation or modeling of air-to-air combat, for example. The best way to test out a given model without considerable expense and without detriment to flight safety is to "fly it" on a cockpit simulator. The capabilities of the simulator equipment available in our regiment, however, are not much superior to the capabilities of powered children's toys. It has long since become obsolete and technically outdated. We fighter pilots need flight simulators in which one can practice expert-level advanced aerobatic maneuvers, combat maneuvering, and the full spectrum of weapons delivery against air and ground targets. I realize that the cost of developing such simulator equipment is considerable, but I am convinced that costs will be more than repaid, for even intensive actual flight operations many times fail to give a full picture of a pilot's readiness for combat.

...The flight in which I flew rear position was to destroy a target drone. According to the conditions of the training drill, the lead pair and my element leader were to deliver cannon fire. Proceeding from these conditions, engagement simulation was to go as follows: if the target was not destroyed by the cannon fire, I was to take it out with a missile.

I should note that all were experienced combat pilots. It would seem to be a fairly easy mission. But it was not. The cannon fire failed to produce the desired result. A missile saved the day, but this was no consolation to us: it had become clear that there was a serious deficiency in our combat training, for who knows how things would have ended if I was also to fire my cannon. Could the failed marksmanship have been avoided? It probably could have been if we had the possibility of working on such a mission in a quality simulator.

Another very important help in training flight personnel and ensuring flight safety is knowledgeable analysis of flight data recorder tapes. Unfortunately flight data recorder equipment fails to meet today's requirements. Pilots experience serious difficulties when it is necessary to analyze obtained data quickly and efficiently. They must deal with a large number of diagrams and graphs and expend considerable effort on deciphering tapes recording flight parameters. I believe that time required to receive and analyze data can be shortened by making the data more graphic.

For example, data recorder tape recording is black-and-white, but if the tape were colored it would greatly simplify the deciphering and interpretation process and give the data better graphic clarity! There is also another possibility: read the data off a computer display. Flight personnel also need videotape equipment, which would give them a clear picture of their performance on takeoff and landing.

It has long since been demonstrated that the quality of performance of combat training sorties and mishap-free operations depend directly on the level of job proficiency of engineers and technical personnel. Logically this level

should correspond to the proficiency rating held by the ground maintenance specialist. But while pilot and navigator have moral and material incentive to boost their proficiency rating, technician personnel are little concerned by this question, to put it mildly.

The majority of ground maintenance personnel are without question conscientious and aware individuals, who do not limit their expenditure of labor to ensure that it equals their level of pay. But it is also an indisputable fact that in conditions of perestroika it is necessary to mobilize all mechanisms of socialist labor incentive. I realize that this is a complex issue, but nevertheless the people in the line units are awaiting its solution.

In my opinion there is another reserve potential available in Air Force units for improving the quality of labor of flight personnel which is not currently being sufficiently utilized—intelligent organization of rest regimen for Air Force personnel. Therapeutic rest facilities in the units frequently give more the appearance of cheap hotel rooms. And yet the money spent on building these standard facilities could just as well be used to build small rest facilities in a more bucolic environment, such as civilian enterprises do. I am sure that Air Force personnel would obtain fuller relaxation of psychological and physical stresses away from the airbase environment.

Don't get me wrong. My letter to the editors is not an attempt to dump onto the shoulders of the Air Forces command authorities problems which are of critical interest at the Air Force unit level. As was noted at the 19th All-Union Party Conference, difficulties can be surmounted only by working together. I therefore propose that we not wait for manna from heaven but rather mount a well-coordinated collective attack on these problems. In my opinion the journal AVIATSIYA I KOSMONAVTIKA could serve as a collection center for Air Force personnel suggestions and opinions.

Mutual Understanding—Maj I. Pavlov

The incident happened quite some time ago, but a great many people in our Air Force regiment and our airfield technical support battalion (OBATO) still remember it. Once air subunits, for reasons not under the control of battalion personnel, were unable fully to carry out all the tasks specified by the flight operations schedule. Nevertheless, at the flight operations critique and review session OBATO supervisor personnel were forced to listen to accusations to the effect that they had failed to make airfield mobile ground equipment (APA) ready for the day's flight operations. This resulted in a conflict which led to a special inquiry. The events in question were investigated, and the unwarranted accusations against the ground equipment people were dropped. Nevertheless this left an unpleasant taste in people's mouths for quite some time.

The fact is that even prior to this incident the men of the regiment and battalion did not always find common ground. For some time any failure to accomplish flight operations shift assignments would automatically be blamed on the OBATO. Rarely would there be a staff meeting or meeting to total up performance results without complaints directed against battalion supervisor personnel. I admit that some of these complaints were just and deserved. But they would be made by the regimental aviation engineer service with the obvious intention of drawing the attention of higher echelons of authority away from their own mistakes and with the intention of focusing the higher-ups' anger solely on shortcomings and deficiencies in flight operations support activities. It would also happen in the regiment that when it was time to report the gross flight operations figures they would ignore those same shortcomings (in readying service vehicles, for example). Thus we had what can be called "selective integrity"....

The cited incident should have rung alarm bells for the command element and party organizations of the two interlinked Air Force units. Just like a barometer, it indicated that storm clouds were gathering. Immediate steps should have been taken to create a healthy working environment and to avoid in the future subjective mutual accusations and nervous irritability, which were harming the common cause. This did not happen, however. The confrontation between the two sides continued to escalate. It became increasingly more difficult for personnel of the two units to understand one another, and there was a loss of coordination and interaction in supporting flight personnel combat training.

Take, for example, the preparation of requests for service vehicles on the eve of preliminary preparations for flight operations and for flight operations proper by the aviation engineer service, which was headed at the time by Lt Col Z. Dmitruk. Both he and his subordinates were well acquainted with the finite capabilities of the motor transport support company. But the aviation engineer service people time and again acted as if the actual state of affairs in the supporting subunit did not concern the regimental engineers. They made out vehicle requests in a rather cavalier fashion. Once again there were mutual accusations and complaints.

Today, just as in the past, the battalion's vehicle operations people have a great many problems. They include inadequate training (at DOSAAF driver training schools) on the part of some of the drivers, poor supply of replacement parts, and a greater volume of work pertaining to servicing and maintaining the service vehicles. One of the oxygen servicing trucks had broken down, and the other had been reassigned to the neighboring subunit.... Naturally it is difficult to operate without a hitch under such conditions. Nevertheless on the whole the service vehicle operators have been able to handle and are continuing to be able to handle their job

duties. It is also gratifying to note that their labor efficiency has now been greatly bolstered by a change in attitude by the regimental aviation engineer service officers.

Of course changes for the better did not take place immediately. The new regimental commander and his deputy commander for aviation engineer service had to exert considerable efforts in order to place relations with the battalion on a businesslike, solid footing, taking into account the realistic capabilities of the service vehicle operators. The main thing sought right at the outset by Maj A. Shumskiy, who was in charge of the regimental aviation engineer service, was to eradicate the established habit of simply blaming the separate airfield technical support battalion for all foul-ups in flight operations support and of viewing in a tendentious manner deficiencies in the performance of supporting subunits.

Now, for example, the flight operations senior engineer as a rule takes active part in correcting delays which sometimes arise through the fault of airfield technical support personnel and does not act, as in the past, as an impartial outside observer who merely takes note of problems. Request forms for service vehicles are filled out following preliminary coordination with battalion officers. Improved planning and scheduling of flight operations support resources has revealed substantial reserve potential for consistent and higher-quality preparation of service vehicles for operation.

These and other changes have had an immediate effect on improving the quality of flight operations support. And, as a result, flight operations shifts have produced increased return on efforts, and there has been an improvement in flight operations safety.

Changes for the better in joint activities of Air Force personnel are in evidence. But we cannot remain silent about what is continuing to hinder high-quality support of aircrew combat training. There also occur interruptions in electric power supply. The separate airfield technical support battalion command element has been addressing this problem for quite some time. Several requisition forms have been sent to higher headquarters requesting the needed cable, but without result. There is also another problem. The occupational specialties of carpenter, painter, and electrician have been eliminated in the unit's table of organization. And yet the volume of carpentry and painting work not only has not diminished but on the contrary has increased. Aircraft servicing and maintenance personnel must be used to perform this work.

In short, we have plenty of difficulties, and they cannot be resolved without help and support from the regiment. There should be even better mutual understanding between the two units.

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Fighter-Bomber Squadron Commander Clashes With Political Worker

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[Article, published under the heading "Problems of Development of Young Officers," by Maj S. Mikhaylov: "Thorny Is the Path to Truth"]

[Text] The fighter-bomber's wheels hit the concrete runway surface hard, bouncing the aircraft back into the air. This was followed by another bounce. "Your throttle! Cut your throttle!" squadron commander Maj A. Shipilov shouted, although the pilot could not possibly hear him.

Apparently the pilot finally figured out by himself what to do, but he still ran off the end of the runway....

"There goes my day!" Shipilov pounded his palm with his fist. But in the presence of his men he tried to restrain himself. He thought to himself: "Can you believe it? For six months things have been on the upswing, and now we have a near mishap."

"Who is that, Anatoliy Vasilyevich?" inquired Maj O. Zaytsev, squadron deputy commander for political affairs, who was standing alongside him.

"Vasya, who else? Incidentally, Oleg Ivanovich, your protege." After a moment of silence he added: "He should have been washed out long ago. He'll never make a pilot. But we keep him, since the deputy commander for political affairs feels sorry for him."

"That is a bit strange. If somebody is to blame for a near-mishap situation, get rid of him to make things easier for the squadron commander."

"Are you kidding?" Shipilov shifted to a friendly tone of voice, feeling embarrassed, and hastened to add: "Okay, I've got to go get a 'thank you' from our superiors. We'll continue the conversation when I get back from the tower."

The deputy commander for political affairs grabbed the squadron commander by the elbow: "Please, Anatoliy, don't voice any hasty conclusions about Shepetov in front of the regimental commander. Remember when you were his age."

The squadron commander fell silent. He strode off toward the control tower. The commissar's words had cut him to the quick.

Yes, Oleg Zaytsev, a classmate and good friend since their cadet days, certainly knew how difficult things had been for Shipilov. At the same age when Lieutenant Shepetov soloed, the question of whether Anatoliy was to be a military pilot was being determined.

His first try at service school had been a failure. He then enrolled at the Tomsk Construction Engineering Institute. He soon realized, however, that this was not his calling. He left for Moscow on the very first day of vacation. He went to Air Force Headquarters. He was received by a gray-haired general, a combat veteran from the war, who patiently listened to what he had to say.

"Are you willing to enroll at Borisoglebsk?" the general asked, glancing up at him questioningly.

"I want to go to Kacha and become a fighter pilot!" Everything contained in his heart was concentrated in these words: the passionate dream of youth, the bitter taste of failure, and hope.

To this very day emotions well up when he recalls that conversation which determined his fate. The deputy commander for political affairs certainly knew what emotional button to push! He certainly couldn't argue with him.

Nevertheless it was hard for Major Shipilov to hold his irritation in check. His irritation was caused not only by the near mishap. He was furious at the position taken by the deputy commander for political affairs in the matter of Lieutenant Shepetov. Recently they had been arguing more and more frequently. They were unable to find common ground. This was cause for concern, since in the past they had thought and acted in unison. In addition, Zaytsev had been setting him straight with increasing frequency, tactfully but persistently.

At first he agreed with his reasoning, but gradually another sentiment emerged: does he really think that I understand people less than he does? Shipilov gave increasing thought to where and when the crack had appeared in their relationship.

...The service school graduates arrived at the regiment when Shipilov was on leave. Upon his return he immediately became acquainted with the newcomers who had been assigned to his squadron. He then talked with Maj O. Zaytsev about the work that had been done. "Good boy, he did a good job," he said to himself, pleased. "He had an individual talk with each one. He took note both of the leaders and those who have not yet come as far along."

These observations proved very useful. The ground training program was approaching an end, and the squadron commander needed to be familiar with the specific features and characteristics of each one of his men.

"And what about Mamay?" he nodded toward the filled-out questionnaire. "Will he be able to handle the flight program with his triple burden?"

Shipilov had grounds for concern. He had never before met a person in the situation of Yuriy Mamay, a lieutenant who already had several children, the father of female triplets.

"He will," replied Zaytsev with conviction. "He is a knowledgeable lad. And he is no wimp. We'll help him arrange quarters for his family. We'll submit a request to headquarters."

At that time there was unanimity about Shepetov: He was disciplined, diligent, and passed all tests right on schedule.

But that questionnaire data! No matter how hard the squadron commander and his deputy commander for political affairs tried to put together a detailed picture of each newcomer on the basis of the documents, the picture turned out to be very general and diffuse. It was evident that their service school instructors had not tried very hard to draw a clear picture of the individual characteristics of their charges.

Each day added strokes to the "portraits" of these lieutenants.

Soon subunit Komsomol leader Lt Yu. Gubin came to see Major Shipilov.

"The squadron Komsomol committee invites you to a get-together on the topic 'Victory in the Air Is Forged out on the Ground'."

"Fine," the squadron commander replied. "Who is the get-together with?" "With you."

"This must be at the initiative of Zaytsev," the thought flashed through his mind. When Gubin left, Shipilov commented, not without irony: "What kind of a new activity is this? We see one another every day."

"Of course," the political worker agreed. "But our dealings with the men are between commander and subordinate. We are going to try to make things a little less formal."

A frank conversation was held that evening. The young aviators reflected together about the officer's career, about duty and honor, about the sources of flying skill. That evening added mutual understanding and helped Shipilov gain better knowledge of the thoughts and concerns of young officers and helped him spot new character traits in Mamay, Sevastyanov, and Shepetov.

Shipilov was pleased with the change Major Zaytsev had introduced in his command routine. After that evening he would inquire with increasing frequency: "What other interesting topics of discussion do you have in store for us?"

"Quarters for Mamay," Major Zaytsev replied on one occasion. He explained: "We have here a microcosm of social policy and fairness. All the lieutenants feel bad about him."

"And we do not?" the squadron commander rejoined. "The regimental commander has taken up this matter personally."

A few days later, in the preflight briefing room, he received a summons: "Major Shipilov report to the commanding officer!"

When he returned there was a big smile on his face. As he entered the classroom he announced loudly to Mamay, so that all could hear: "Summon your family! We have palatial quarters for you: four rooms with all the conveniences."

In the mornings, when the squadron commander began the day with a general talk prior to flight operations, he would catch himself peering all too intently at Lieutenant Mamay, looking for signs of preoccupation with the difficult concerns of family, fatigue, a sleepless night. But the stocky, sturdy young lad always radiated calm optimism.

Time and again Shipilov witnessed examples of the political worker's rightness of thinking and action. Concerns of family do not bring increased fatigue but rather reliability in flight performance. It was apparent that he had been mistaken, that he had assessed the situation too one-sidedly when he was becoming acquainted with the new replacements. On the one hand it would seem that he was pleased that he had erred, while on the other hand he felt the presence of turbid feelings building up deep inside. After all he, Shipilov, who was not devoid of touchy pride, felt that Zaytsev was certainly in no way superior to himself. Then why was it that the role of leader in indoctrination of the men belonged not to him, the squadron commander, but rather to the deputy commander for political affairs, and why was the latter more accurate and precise in determining the motivations and logic of the young lieutenants' conduct and behavior?

He clutched at a thought which soothed his injured pride: it was a commissar's business to read people's souls, while my business is to get them flying and to teach them to become combat pilots. Is this perhaps the reason why he displayed stubborn rigidity in his flight performance evaluations when the deputy commander for political affairs expressed doubts? There would seem to be grounds for this: Shipilov was the most experienced methods expert in the squadron.

Once Major Zaytsev asked: "Are you not being a little harsh with Smirnov? Instead of going up dual, put him in the flight simulator. His mistakes are minor. All the young pilots make minor mistakes."

"The point is not a specific error," Shipilov replied sharply. "His flying is inconsistent. And since he lacks stability of performance, a mishap-threatening situation could occur at any time."

"Well then, how about some additional dual instruction? After all, soon the lieutenant is supposed to be making his first solo flight. The lad should not be held back excessively long," retorted Zaytsev.

Major Shipilov knew that the entire regiment was getting ready for an important day—the lieutenants' first solo training sorties. Naturally he too wanted all the squadron's young pilots to solo successfully at the same time. But he had no right to ignore performance deficiencies just for the sake of this.

"It is wrong to push things just to boost quantitative figures," he insisted. "We need reliability not in words, but in the sky."

Only much later would a flight operations shift settle the argument between the squadron commander and the deputy commander for political affairs.

...Major Shipilov, who had just taxied to the ramp, heard an alarming radio message: "Pressure is dropping! Altitude...."

From the call sign he knew that it was Lieutenant Smirnov. At such a moment the decision was up to him. Nobody had the right to order him to try and save his aircraft. The voice over the radio, in spite of the note of agitation, was firm: "Performing emergency gear lowering procedure."

Major Shipilov counted off the seconds, trying to see a mental picture of the pilot's actions. He noted the time—the radio silence had dragged on too long. He transmitted a brief command: "928! This is 921.... Inform tower of your actions."

This time the pilot's voice sounded more confident. Evidently the feeling that the squadron commander was close by and would help out, a feeling formed by hours of flying in the dual trainer, had been triggered.

Peering out from his cockpit at the combat jet, which was passing over the runway threshold, Shipilov saw that the main gear and nose gear were extended. He hastily jumped to the ground and proceeded to run toward the engineer's command post. From that vantage point he nervously watched the fighter-bomber as it descended on final. The aircraft touched down lightly on the concrete runway surface. This was that reliability of performance by a subordinate about which every commander dreams!

It took time to settle the dispute between the squadron commander and the deputy commander for political affairs. At the time they were unable to agree about Smirnov. But on that day he was not the main cause of

disagreement. Major Zaytsev was particularly concerned by a no-uncertain-terms statement made by the squadron commander: "We're washing Shepetov out...."

Oleg Ivanovich knew what a heavy blow this turn of events would be for the modest, hardworking lieutenant. On the other hand the squadron commander had strong arguments on his side: the pilot was simply not making it. He himself sensed his weak points. One can imagine how difficult it was for him to state frankly that he was not ready to solo.

"Let's not be so hasty about clipping the lad's wings," the deputy commander for political affairs decided to have one more talk with the squadron commander.

But Shipilov firmly held his ground. A little later the two went at each other at a party meeting, during discussion of implementation of the party's demands pertaining to working with personnel. Nor did Major Zaytsev have any qualms about appealing to the regimental political section chief. The latter supported the deputy commander for political affairs position.

"You couldn't do it by persuasion, so you do it by party authority?" Shipilov summed it up. "And what about perestroika with its demandingness, responsibility, and additional work? Just try to use the additional work bit with people like Shepetov."

"We've got to try, Anatoliy Vasilyevich, and maybe even restructure ourselves a bit," Zaytsev calmly replied. "To wash him out means to admit one's helplessness."

They had to go to the regimental commander with their conflicting opinions. It was decided that Lieutenant Shepetov would fly dual with the regimental commander to prepare for soloing. Following additional check rides he was permitted to solo.

The deputy commander for political affairs walked up to the squadron commander, who was watching the men congratulating Shepetov.

"Is the wingman not correcting the flight leader's heading a bit too often? Are we also going to be debating in combat about which of us is right?" Shipilov jokingly asked his commissar.

"We have never had any such problems when flying as leader and wingman," Zaytsev replied in the same tone. "The flight leader's word is law for the wingman. But if the commander considers the common sense of his subordinate, the principle of one-man command can only become stronger. And in battle, you see, victory becomes closer."

"We'll keep that in mind," grinned Shipilov, "particularly since we'll soon be holding a tactical air exercise."

...The four-ship fighter-bomber element was proceeding at high speed under a low overcast. As they approached the range, Major Zaytsev's voice came over the radio: "Flight leader, adjust heading left. One point five to waypoint."

"Aggressor" tanks appeared off in the distance.

"Fighters over FEBA!" came Zaytsev's voice again. He was the first to spot the silvery-skinned interceptors popping out of the mist.

"Maneuver!"

When the aircraft landed back at the base, a message was received from the range that Shipilov's element had earned a mark of excellent. This meant that the squadron socialist pledges had been fully met. Somewhat later an awards ceremony was held, at which A. Shipilov was awarded the Distinguished Service Medal for success in combat and political training. His deputy commander for political affairs was the first to offer heartfelt congratulations to the squadron commander.

"I thank you for the heading adjustment, not only in the air but on the ground as well," Shipilov responded with sincere candor to Zaytsev's firm handshake. "You got me onto the right heading just in time! Therefore you can consider that this award belongs to both of us."

"I accept," Zaytsev replied with a grin. "We have common heading and concerns: the wingman goes where the element leader goes...."

It was precisely inquiry and common enthusiasm for the job at hand which cemented the incipient crack in the relationship between the squadron commander and his deputy commander for political affairs. Truth and the correct approach sometimes emerged in the course of heated debate, in the clash of differing points of view. The solid bond of comradeship between commanding officer and political worker only became stronger from this. As they worked and struggled to accomplish the professional development of the young pilots, they themselves were undergoing professional development.

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Ground-Attack Squadron in Action in Afghanistan
91440073g Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 16-18

[Article, published under the heading "Great Vigilance, Constant Combat Readiness," by Col Ye. Besschetnov: "At the Far Edge of the Possible"]

[Text] Peering down at the jumbled rockpile of gray, lifeless mountains passing under his wing, squadron commander Lt Col G. Strepotov, who was leading a

four-ship element of ground-attack aircraft, was endeavoring to determine, before they were past the point, where the specified grid square began. Judging from intelligence data, the dushman [Afghan rebels] had set up a weapons and ammunition storage point at this location. Their mission was to hit this supply dump. The element leader was concerned: how would his force handle the mission? The pilots lacked experience—they had only been in Afghanistan for two weeks. There were many things to which they were not yet accustomed.

They were now over the search area. The mountains here were lower in elevation. Winding trails, illuminated by the bright sun, were clearly visible at the foot of the mountains. The trails converged by the dark mouth of a cave. "That must be the supply dump," Strepetov noted to himself. While still fairly far out, he fired a "registration" salvo of rockets. The slopes and mountaintops immediately erupted with intensive machinegun fire. That was definitely their target!

The other pilots followed the squadron commander in, at the specified range released rockets at the dark cave mouth, and then broke away. Strepetov was pleased: the ammunition was detonating in secondary explosions, throwing up clouds of dust and smoke. The four-ship ground-attack element flew a second attack pass, hitting the rebel weapons and ammunition dump hard. In the heat of battle the commander had not noticed whether they were taking fire. Soon he heard his wingman's voice over the radio: "Skipper, the 'ghosts' [slang for Afghan rebels] have launched a missile! It's heading your way!"

"Roger. Initiating evasive maneuver!"

He vigorously broke from the attack heading, jinking laterally and vertically. He proceeded to release heat flares. One second passed, two seconds, three seconds.... He heard a muffled explosion somewhere to the rear and below his aircraft. It was buffeted by a shock wave, but it responded to the controls; apparently he had taken no damage. It seemed he had successfully evaded the missile. His wingmen reported in one by one. They also had no damage to report. A minute later the four-ship element, joining into formation, proceeded swiftly across the rocky peaks toward their home base.

This was the first instance of the dushman firing a Stinger missile at the squadron's aircraft. Deliberately or not, they were aiming at the squadron commander's ship. He successfully thwarted their attempt to shoot down the combat aircraft, and he had successfully evaded the missile while lacking missile evasion experience. Upon their return to the base he related in detail what had happened, how he had executed the missile evasion maneuver, and what had ensured success. Naturally, however, he did not limit himself to this. He thought back time and again to his actions during that

mission. Very soon thereafter he organized a training class for the pilots, at which they thoroughly analyzed methods and techniques of penetrating hostile air defense.

...I met Grigoriy Strepetov on Afghan soil. Storm clouds were slowly drifting above the snowcapped peaks, from time to time sending down incandescent, intricately-branching lightning bolts. Combat sorties had been temporarily suspended, and the squadron commander and I headed out onto the flight line, where nobody could interrupt our conversation. The dark-green mottled-pattern ground-attack jet aircraft, carrying bombs and loaded rocket pods on their underwing pylons, stood motionless on the metal mat plates covering the clay soil, as if waiting for the mission departure command.

Grigoriy Grigoryevich is a Muscovite. He received his secondary education at a worker youth school. He held a job while going to school. He could have learned a civilian trade and remained in the capital. He was drawn to military aviation, however. Not shying away from duty at remote garrisons, Grigoriy preferred the career of a military pilot. He joined the Lipetsk DOSAAF Flying Club; a year later he had to transfer to the Kaluga Club. Later, after being drafted into the Air Forces, he enrolled in an external-studies program and completed the military pilot school curriculum. In 1973, with a pilot-technician diploma, he was assigned to the Red Banner Central Asian Military District.

Totally dedicated to his chosen career and passionately devoted to the flying profession, Grigoriy Strepetov, upon reporting for duty to his assigned regiment, totally immersed himself in flying, working hard and honorably. The young officer advanced up the career ladder with firm step. He spent a year as a pilot, after which he was promoted to senior pilot. A year later he was made a flight commander. In this position his qualities not only as a combat pilot but also as a skilled mentor of his subordinates became fully revealed. He did a lot of flying, and he worked patiently on the development of the younger pilots.

He commanded a flight for 8 years, training a large body of pilots. Finally, in 1984, after being transferred to the Red-Banner Carpathian Military District, Strepetov was made a squadron deputy commander. Soon, after conversion-training over to a combat aircraft which was new to him—a jet-propelled ground-attack aircraft—he assumed command of a squadron.

Sharing his impressions of combat activities connected with rendering internationalist assistance to the Afghan people, Grigoriy Grigoryevich spoke in detail about the difficult environment in which they were forced to operate.

"In these conditions the commanding officer bears a heavy responsibility for the unit he commands," he said. "There are heavy demands on a commanding officer in any case, and even more so here...."

I became acquainted with the squadron's activities, and I became increasingly convinced that the idea of commander responsibility was the leitmotiv in this subunit for the entire activities of Lt Col G. Strepetov. Conscious of the fact that a great deal depends on him, Grigoriy Grigoryevich, relying on the assistance of his deputy commanders and flight commanders, worked tirelessly to improve the process of training and indoctrination of his men, especially regarding their moral-psychological conditioning, organization of aircrew combat activities in varying tactical environment, situation, and climatic conditions, and maintaining the squadron in a continuous state of combat readiness.

Here on Afghan soil party member Lt Col G. Strepetov and his men have been put to a severe test of combat maturity. And the commanding officer deserves a great deal of the credit for the fact that this test has been passed with flying colors. There is not a single pilot or technician in the squadron who has not been decorated. Some have been decorated twice. And party member Sr Lt Konstantin Pavlyukov, a pilot of this squadron who perished in unequal combat with the dushman, was awarded the title Hero of the Soviet Union.

Lt Col G. Strepetov, realizing that this combat situation demanded a great deal of each and every individual, endeavored, working together with the political worker, the party and Komsomol organizations, to instill in the men a sense of duty, love of the military profession, boldness, daring, and fearlessness. Talking with the pilots, he would repeatedly say: "One cannot go into battle with quaking knees. If you go out on a mission with a defeatist attitude, you are dooming yourself to failure in advance. Only thorough knowledge of the ground and air environment in the tactical area of operations, boldness, determination, self-possession, self-confidence, and clarity of reason will help one emerge victorious."

The men gained maturity, they became mentally toughened, and they enjoyed increased combat successes. While not inclined to sentimentality, nevertheless Grigoriy Grigoryevich cannot recall without emotion how the squadron's pilots were spoiling for combat from their very first days in-country.

"You couldn't help but sympathize with them when a mission was cancelled for some reason," he said.

But there was a great deal of work to do, and the squadron commander noted with satisfaction that the pilots were becoming transformed before his very eyes, with each passing day and with each sortie. Sr Lts Andrey Reznikov, Vyacheslav Fechenko, Konstantin Pavlyukov, Viktor Zemlyakov, and Vladimir Paltusov....

A week passed, a second week passed, and the squadron commander saw them anew, as it were, men who had matured quickly, becoming deeply aware of the enormous scope of responsibility which rested on their shoulders.

In this situation no impassioned appeals or lofty words could affect the men more powerfully than their commanding officer's personal example. And Lt Col G. Strepetov, a man of extreme courage and valor, permeated with awareness of responsibility for the unit under his command, provided an example of bold, valiant, courageous actions, displaying in the air truly outstanding professional skill.

...The command post sent out a two-ship element led by the squadron commander. It was a difficult mission. A Soviet aircraft had been crippled during a reconnaissance flight over the mountains. The pilot had ejected. The squadron commander and his wingman—the deputy commander for political affairs—had to locate the pilot. If they did not find him quickly, he could be captured by the dushman.

In the search area the aircraft pair proceeded to fly a 360 degree banked turn. They flew one complete turn, followed by a second. But soon it became obvious that from the altitude at which they were flying, in order to avoid taking a SAM missile hit, it was impossible to spot either the parachute canopy or the pilot.

"This isn't going to get us anywhere," Strepetov radioed to his wingman. "Let's go lower. Follow me...."

Strepetov employed a stratagem: flying about 20 kilometers away from the point where the aircraft had gone down, the two aircraft dove into an adjacent gorge and, flying nap-of-the-earth while maintaining high speed, proceeded to approach the search area. They reached the target gorge. The squadron commander, followed by his wingman, turned steeply and entered the gorge. There was a village up ahead. They spotted pulsating flashes on the right-side slope of the gorge.

"Heavy machinegun," Strepetov figured. "The dushman have been expecting us. They are counting on us losing our nerve.... No way!" he clenched his teeth.

The ground-attack aircraft, maintaining their heading, swiftly shot forward, deep into the gorge, leaving the weapon position far behind. The further they advanced, the narrower the gorge became.

Strepetov combed the slopes with his gaze, but the pilot was nowhere to be seen. The gorge took a sharp turn up ahead. Truly virtuoso flying technique was required to avoid the vertical rock wall which was blocking their path. The high G-load crushed the pilots down into their seats. Their vision grew dim, but they maintained pressure on the controls, completing the turn.

Right after the turn they encountered a new obstacle: the gorge ended in a sheer rock face, which merged into the body of the range. Another test of their professional skill! The high G-loads of the turn they had just made had resulted in an appreciable decrease in airspeed, and now the aircraft climbed sluggishly, unresponsively, as if unable to gain altitude.

Finally they crested the ridge. On the slope beyond the ridge both the squadron commander and his wingman spotted a parachute hung up on the rocks below and the pilot lying on the ground nearby.

"Did you see him? There he is!" the squadron commander excitedly radioed his wingman.

"Affirmative, I see him, skipper!" the wingman replied. "He's alive, but for some reason he's not getting to his feet.... He's probably wounded."

"Now the main thing is to cover him!"

Strepetov, losing no time, reported the situation back to the command post and gave the location coordinates of the downed flier.

The aircraft pair gained altitude and proceeded to "work over" with missile and rocket fire probable dushman locations and avenues of approach to the Soviet pilot. After flying two attack passes, they changed course and headed for the heavy machinegun position from which they had received fire as they entered the gorge. Explosions, flame, clouds of dust and smoke.... The position was destroyed!

15 minutes later a pair of search and rescue helicopters appeared. After picking up the pilot, they headed off down the snowy crest toward Kabul, to a military hospital.

Out of several hundred difficult, hazardous missions flown in the skies over Afghanistan, there is one which Lt Col G. Strepetov will probably never forget.

The squadron command element was ordered to report immediately to the command post. A senior officer—representing the limited Soviet forces command—who had just arrived at the garrison, gave them a briefing: according to intelligence, one of the fiercest and most savage leaders of the counterrevolutionary bandit forces, a sworn enemy of the Afghan people, who had been sentenced to death in absentia by the Afghan people for his crimes, was presently in a fort at the south edge of the village of Matan.

"He may not be staying long at the fort. We cannot let this opportunity slip by. All hopes lie with your unit. We've got to hit the fort. Let this uncrowned king of the Panjshir know that he is by no means safe."

Quickly performing the requisite calculations, the pilots took to the air. They spotted the target as they swept over the designated grid square and immediately put their aircraft into an almost vertical dive, led by Lieutenant Colonel Strepetov.

The floor of the gorge was engulfed in grayish semidarkness. The rays of the rising sun, skittering along the mountain peaks, had not yet penetrated into the gorge. But the fort, ringed by high stone walls, with several separate structures within the walls, could be distinguished at the edge of the kishlak [mountain village]. Strepetov was sure that it would be well defended. But he and his wingmen knew what they were doing and for what they were risking their lives. Putting this hardened dushman chieftain out of action would mean a great deal....

Lt Col G. Strepetov, at the spearhead of the attack, as it were, banked right and left, maintaining this weaving maneuver in order to avoid taking ground fire, and kept his eyes on the target as they drew closer. He squinted and clenched his teeth. Heavy machineguns and a mountain-version antiaircraft gun opened fire on the approaching aircraft from the fort compound. The dushman, however, blinded by the background bright sky immediately preceding sunup, probably were having difficulty distinguishing the aircraft against the darkened mountains behind them—the tracer trails were arcing low.

Strepetov ceased his evasive maneuvering 500 meters before closing to effective fire delivery range and, after waiting a couple of seconds for the aircraft to "settle down," fired off his missiles. Successful release. He saw the missiles streaking out ahead of the aircraft, proceeding toward the squarish outline of the fort. He became more and more taken up by the excitement of battle. Continuing his dive, the squadron commander moved the weapons selector to bombs, and then, waiting until the pipper moved onto the target, released his bomb load. His wingmen followed suit, delivering powerful, crushing blows.

As he was breaking away, Grigoriy Grigoryevich, glancing sideward, noticed a cloud of smoke and dust rising high above the fort. He was pleased. "If the intelligence was accurate," he said to himself, "perhaps our bombs carried out the sentence brought against this bandit by the Afghan people."

Barely had the flight taxied to the ramp when the representative of the Soviet forces command headed toward the squadron commander's aircraft, clearly impatient for news. Lieutenant Colonel Strepetov, still wearing his flight helmet, still filled with the emotional excitement of combat, strode toward him and reported mission accomplished.

"What do you think, how effective was the strike?" the senior-level officer asked.

The squadron commander and the flight's pilots, who had walked up to the two, began animatedly relating how the mission had gone and how they had delivered the strike.

"In any case, we got them good," stated Grigoriy Grigoryevich in conclusion with a smile. "We put all missiles and bombs into the target. Now we'll wait for strike results confirmation...."

The text of a radio intercept message was placed on the senior-level officer's desk before dark. The intercepted message indicated that practically the entire bodyguard of the rebel chief had been killed and that the latter had been gravely wounded.

Commander's responsibility.... What limits should one impose on oneself? Out there in Afghanistan Grigoriy Grigoryevich frequently received recommendations when flying missions not to descend below a certain altitude in order for him and his men to be safe from anti-aircraft missiles. It would certainly be easier simply to follow those recommendations: deliver strikes from high altitude, subjecting neither oneself nor one's men to even the slightest risk. But what is the effectiveness of such strikes? And how would such cautiousness reflect on the development of the pilots and their moral-ethical conditioning?

Having experienced a solid school of commander training, it did not take him long to realize how harmful this could be for his men. What can be worse than the awareness that you could have destroyed the enemy but did not do so, that you could have saved friendly ground elements pinned down by dushman forces and you failed to save them, protecting your own skin while failing to save others? In such instances a pilot ceases to respect himself both as a combat pilot and as a man. Could such a thing be permitted? This is why Lt Col G. Strepetov, aware of his responsibility both for the lives of his men and for the quality of performance of assigned missions, always worked only with certitude, only at the limit of the possible. It is for this reason that the squadron's pilots emulated their commanding officer and had great respect for him. Right up to their last day in the Republic of Afghanistan they remained true to their duty, honor, and conscience.

Upon his return home, party member Lt Col G. Strepetov, holder of the Order of the Red Star, was placed in command of a squadron of expert combat pilots. He fully uses the entirety of the outstanding experience and know-how he has amassed during his years of military service in the training of bold, courageous combat pilots. He has a great deal he can pass on to others.

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Pilot Discusses Features of Combat Flying in Afghanistan

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[Article, published under the heading "Into the Military Airman's Arsenal," by Military Pilot 1st Class Capt S. Popov, flight commander: "What Do You Take Into Combat?"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] While carrying out his internationalist duty in the Republic of Afghanistan, Capt S. Popov went through the stern school of combat skill. His superiors and subordinates unanimously praise his high degree of combat proficiency and his resourcefulness in combat engagements with a wily adversary. The search for new tactical ideas, development of effective combat techniques, and careful analysis of advanced know-how are for Capt S. Popov not only a job-related duty but an endeavor of professional enthusiasm as well. At the request of the editors, this officer shares with the journal's readers his thoughts about tactics in combat conditions.

...

Our principal professional interests became concentrated on tactics several months prior to our departure for Afghanistan. We had realized prior to this time that the key to victory must be sought precisely in tactical skill. But now theory was assuming real features, a high price, and strong professional accountability.

We questioned those pilots who had already seen action in Afghanistan. We were interested in every detail, every tiny item to which one perhaps does not pay particular attention during routine combat training. I must admit that every one of the Afghan veterans subjected all of our questions to the most detailed analysis. And we noted right at the outset that officers with combat experience were not merely sharing with us facts of which they knew but were endeavoring to lead us to independent tactical conclusions. They were not so much passing on to us ready solutions and tactics as they were teaching us to think tactically.

I personally am especially grateful to flight commander Maj V. Voronin, from whom I learned and assimilated a great deal. I especially remember the following advice: in combat don't think about yourself, think about your flight; there are no hopeless situations—always look for a way out; never allow yourself for a single second to perform rash or imprudent actions, actions just in the hope that they might work; endeavor to beat the enemy to the punch in delivering fire, and if you are unsuccessful, deliver return fire immediately. On the whole these are well-known rules of action. But when training and preparing for combat they became transformed from theoretical principles into my personal convictions.

In spite of the fact that prior to crossing the boundary between peace and war one has had considerable flight experience and intensive training and preparation for carrying one's internationalist duty, when you report for duty with the limited Soviet forces you realize that your entire professional arsenal constitutes only a foundation for planning each forthcoming mission. And no matter how extensive your own personal combat experience has been, it is nevertheless in the past. A new combat sortie requires a new solution, a new plan, new tactics. This means that the flight commander's primary task in a combat environment is to involve all his men in tactical thinking and planning.

It is particularly beneficial when tactics becomes a subject of collective inquiry. First of all, each pilot in the final analysis perceives an assigned combat mission in his own way, even the most precisely assigned and briefed mission. The commander certainly has the final word, but to listen to the opinion of all the pilots in his flight means substantially to enrich his commander's concept of the combat mission proper.

Secondly, subordinates not only have their own individual understanding of a combat mission but also present their own execution variations. And the commander is presented with plenty of food for thought and a good deal from which to select. There is unquestionably a common gain.

In the third place, collective planning and scheduling of a forthcoming combat mission enables each individual meticulously to go into all details of joint actions in combat. And during combat additional commands and extraneous words are not needed. Pilots instantly understand their flight commander at a single word, and sometimes without any words at all. And this state of unanimity of thinking and action in combat is possible thanks to the fact that, in the course of joint activity on the ground, all variations have been discussed, have become part of the very fiber of all combat pilots, and have taken hold in the men's consciousness with all probable elements and details.

In our flight everybody was involved in tactical work, but I should like to mention in particular the activeness, initiative and tactical resourcefulness of Capt B. Oda-rich, A. Litvinenko, and Sr Lt V. Agadzhanyan.

Where does our tactical analysis of a combat mission begin? The first step is well known. It comprises a full briefing on and analysis of the mission assigned by the commander. I should like to mention just one specific feature which is characteristic of conditions of combat operations in the Republic of Afghanistan. There are factors which are constantly operating during performance of any specific mission. For example, the possibility of encountering antiaircraft weapons virtually at any phase of a mission. Our tactical thinking has been conditioned on the traditional elements of a combat environment: forward line of own troops, tactical air

defense zone, local air defense zone, etc. In Afghanistan one cannot count on such an arrangement. It sometimes happens (rarely, to be sure) that air defense forces immediately in the battlefield area are insignificant, but while en route to the battle area it is entirely possible to come under fire by the most modern weaponry.

No matter how aggressively reconnaissance is conducted, encountering unforeseen circumstances is always a realistic possibility. Therefore one must analyze and predict the situation again and again in the course of working out combat mission variations. The rebels strike both in a straightforward manner and using stealth and subterfuge. They do not tie themselves down to any clearly-defined missions, areas, or objectives. For this reason each combat mission combines for us both known and totally unknown but entirely predictable elements.

The tactics of surprise attack, calculated to stun the adversary, tactics which the rebels use against Afghan air forces and of course against us, is dangerous and effective, but knowable. In one way or another a certain logic is manifested in all things. A visual scan by an experienced and thinking pilot is capable of discovering the adversary's surreptitious schemes.

Frequently victory in combat is grounded on painstaking analysis of an enormous mass of circumstances. Let us say, for example, that the area in which a certain rebel band is located is known. Then we have two or three days of weather which grounds all air operations. In order to avoid coming under lethal fire in the most "secure" area, one must constantly think like the enemy and know how the enemy would act. By what trails might the rebels travel to change their base of operations? Where will they turn up if they are traveling on foot, and where if they are using motor transport? What locations would it be advantageous to select for concealed concentration of men and equipment? From what direction would they logically expect our aircraft to appear? Plus hundreds of other such questions....

We work persistently, independently, and continuously on eliminating situation uncertainty. But will our prediction always be precisely correct? To answer in the affirmative means to relax one's vigilance and to consider the enemy a fool. But prediction efforts result in a great many possible scenario variations, among which there will definitely be variations which are applicable, following minor adjustments, in actual combat, when a full minute is not available for reaching a decision, but several seconds as a rule are available to determine a response move.

Each flight and each two-ship element has its own ready tactical moves in case of an attack with the element of total surprise or if a situation cannot be predicted. Combat experience convinces us that, no matter how critical the situation may be, only two types of response

are out of the question: a rash charge into the enemy's guns, and passive waiting for the outcome, frozen inaction caused by a difficult situation.

It would be erroneous to argue that an absolute guarantee against unforeseen casualties can be gained by means of extensive preliminary preparation for combat. I am only stating that the combat pilot should fight to the end, to the very last possibility of carrying out deliberate, calculated actions.

Coordination between different combat arms and components is very important. We are told this from our very first tactics lesson at service school. But it is in a combat situation that we fully assimilate this simple truth. I would particularly like to emphasize that one should not place all one's hopes on higher-echelon commanders who are responsible for organizing coordination. In any case the commander who will immediately be involved in directing combat will in the final analysis have a better and deeper grasp and understanding of his combat mission than anybody else. The following particular items are revealed to him: where weakness lies; what coordinating forces can make up for a revealed insufficiency of one's own combat power, and how it is to be done; what weak point of the others involved in carrying out your combat mission you can bolster with your own resources; where critical moments are expected to occur and how they can be avoided.

Thus coordination means the broadest possible aggressiveness and initiative on the part of all forces participating in operations and rejection of the role of purely executing entities for which all decisions are made by the commanders. Yes, they make decisions, but not all of them. Yes, they organize, but not in all details.

In addition, the experience and know-how which we possess suggests that personal contacts between coordinating forces are very useful, for it is not a matter of indifference whom you support, whom you cover, to whose assistance you rush, and on whom you yourself count at a difficult moment in battle. Probably such contact is not always feasible, but I am talking about trend and tendency, about the desirability of personal acquaintance between those who will be sharing the fate of battle, as well as one's own fate.

Elaboration of tactical moves also merits serious analysis. Perhaps my conclusions are subject to debate. It is for good reason that they say that truth is born in debate....

Today such terms as *shablon* [pattern] and *stereotip* [fixed, standardized general pattern] have been relegated to a status of disgrace. How much more attractive the following words sound: innovation, unconventional, discovery. But it is my conviction, based on actual combat operations, that the very concept of innovation in combat and its origins are unique phenomena. Two determining circumstances prevail first and foremost in a

combat environment: the fluidity and fast-moving nature of events, and incompleteness of information. Without taking these and other factors into account, reasoning and discourse about professional innovativeness will be far from practical realities.

I consider it to be a proven fact that the tactical skill of a combat pilot is the art and skill of making a choice, correct for a given situation, from a set of prior-assimilated fixed tactical patterns, of course adjusted to fit a specific combat situation. But it is precisely the conscious selection process rather than hope for a sudden inspiration which comprise the substance of tactical innovation in combat.

A fixed, standardized general pattern and a standard elementary tactical move have their positive aspects. They can embody a complex tactical idea. They can be calculated in detail and be comprehensively substantiated at the theoretical level, and they logically embody all preceding combat experience. Obviously this entire task cannot be performed in those few seconds which an aircrew has at its disposal when engaging the enemy.

Each combat engagement advances those questions and problems which, as a result of thorough analysis, become the point of departure for new ideas, concepts, decisions, and tactics.

In our flight we have adopted the position that no matter how a combat mission works out, there are always grounds for critical reevaluation of that which yesterday seemed absolutely perfected. A crew member was slow about reporting that he had spotted the enemy, someone was late by a fraction of a second in switching on essential equipment, or somebody was diverted from the established external visual observation scan pattern to another task....

We work together determining the reasons for such errors, we work together determining ways to eliminate such mistakes, and we work on smoothly honing coordination within and between crews.

I shall mention another airman's combat concern which persistently announces its presence in Afghanistan. Here one fairly frequently encounters abrupt surprises. Sometimes a pilot has only a second or so to avoid taking a hit. And, to be professionally candid, one must admit that sometimes it is not possible rationally to assess the situation. I believe that in these conditions one needs a special response algorithm devised following the principle of "if I don't know what to do, I'll do this...." It is important to get away from passive waiting for an outcome and to avoid the tendency to panic. It is important to have the option of a personally-prescribed combat move. Such a move may not prove to be the best considering the specific situation conditions (but you simply do not know at a critical moment), but it does represent a benefit from the standpoint of morale and

/psychology. "Since I am engaging in an action, it means that I am fighting on an equal basis rather than freezing in the face of surprise attack...."

We select the very simplest response action algorithm for such situations. The aircraft commander executes it virtually on his own, while the other crew members seek to obtain combat information. Any situation clarification becomes a moment of transition from "general-purpose program" to rational response, followed by aggressive combat reaction. Here is an example.

An aircrew quite unexpectedly spotted a flash out ahead along their flight path. There was no enemy in sight. What should they do? I believe that the best solution is to turn immediately in either direction from the current heading and to place fire into the area where the flash was spotted. Perhaps strict logic would dictate maneuver in a different direction, but even a less than optimal choice would complicate the enemy's aim or make homing guidance more difficult for a shoulder-fired surface-to-air missile. And return fire, even inaccurate fire, would equalize the psychological difficulties. But the main advantage lies in the fact that the crew immediately engaged, at the enemy's first shot.

Combat experience also reveals a great deal in the moral-psychological training of our military pilots. Almost everybody has a difficult time at first. Closer attention must also be paid to this. The source of the stress lies not in fear in the face of danger but rather in uncertainty about one's performance capabilities. It is also necessary constantly to combat the complacency of those who have successfully completed the primary phase of emotional stress. Complacency is the threshold to trouble. For this reason the commander must learn to sense his men's attitude and mood, in order to maintain it at a favorable level of combat and moral-psychological readiness.

Here in Afghanistan, in a combat environment, you gain a particularly good understanding of the fact that it is necessary to possess intimate knowledge of one's subordinates. Only by possessing intimate knowledge of one's comrade can one precisely determine what he is capable of doing, not in general terms, but in a combat engagement which will commence several minutes hence. Nor should one dismiss problems of psychological compatibility when a person is performing at the limits of his capabilities. I myself was forced to "part company" with my wingman. We have an excellent relationship at the present time, with no tension whatsoever between us. But we were simply unable to fly together, in a single two-ship element. This was a problem. And we are grateful that our superiors understood our situation and responded in an understanding way rather than merely going through the motions.

Readiness for combat.... It does not divide into a tactical and a moral component. Everything is interlinked. The combat pilot himself forms and shapes that professional-moral glue which helps hold together cold reason and

passionate heart. But the commander, who is responsible for assigned tasks and the men under his command, must constantly ask himself: what are we taking into battle? Are we not seeking to gain victory over the enemy with mere courage, and are we not binding our soul with the fetters of dry mathematical calculation? Combat means man in combat. This must be our point of departure.

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Soviet VFR See and Avoid Procedures

91440073i Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 24-25

[Unattributed article: "Visual Flight Rules (VFR)"]

[Text] Aircrews flying VFR shall practice maximum visual observation of surrounding airspace.

When on a passing course, pilots in command shall keep the other aircraft in view.

See Diagram: Visual Flight Rules (VFR)

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Regimental Party Committee's Role in Improving Flight Safety

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[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Maj Ye. Murygin, member of regimental party committee: "Criterion—End Result"]

[Text] It was not so long ago when some party members in our party organization were more concerned about looking better in the eyes of their superiors than with how they could do a more effective job. The paperwork and report-writing aspect was considered to be practically the main work performance indicator. They became accustomed to this. In many instances they were willing to accept poor results in competition, air and tactical proficiency, as well as violations of flight safety rules and procedures.

Things could not go on like this. Perestroika demanded a resolute breaking of patterns and compelled one critically to evaluate the actual contribution by party members to aviator combat training, and demanded mishap-free flight operations. The time had come for specific deeds.

I shall discuss just one of the areas of activity of our regiment's party committee: measures taken to ensure flight safety.



1. Aircraft approaching one another on a head-on course at the same altitude shall pass with the approaching aircraft on their left, maintaining proper lateral separation.
2. When aircraft are on intersecting courses at the same altitude, the pilot on the left shall climb, and the pilot on the right shall descend, so that they have safe vertical separation at the point of intersection of their flight paths.
3. Avoidance of terrain obstacles observed ahead of an aircraft and extending higher than its flight altitude shall be accomplished as a rule by adjusting flight path to the right of the obstacle, with lateral clearance of not less than 500 meters.
4. One aircraft overtaking another at the same altitude shall pass on the right or, when in the landing pattern, to the outside of the pattern, observing proper lateral separation.

We began by more widely publicizing results. At the initiative of the party committee, the regiment began putting out a "Flight Safety Bulletin." People read with interest about the advanced, progressive work methods used by the best pilots and aviation engineer service personnel. Recently, for example, the "diamond" bombing method and procedures employed by Maj S. Galin when readying weapons for use on the range were discussed in the bulletin. Critical materials are also presented. Often debates arise on the basis of various materials, and discussions are conducted on analyzed air near-mishap situations. Sometimes one of the guilty parties makes excuses, as was the case with officer A. Dronov, while others express sincere regret over having made a mistake. It turns out that such a bulletin is useful to the regiment, although its publication is not prescribed by any guideline document.

Now a few words about how the party committee concerns itself with conditions of flight personnel work and rest. Things used to be pretty noisy and hectic in the control tower building. In such an atmosphere it is very difficult to gather one's energies for a training mission. Party committee members drew attention to this situation. Thanks to their intervention, the situation has now been rectified. Command post team labor discipline has also improved. They no longer make mistakes during flight operations shifts.

As we know, work loads on Air Force personnel are increasing year by year, and nervous stress is consequently increasing as well. How can stress be reduced? Party member officer V. Tamarovski proposed dividing flight personnel annual leave: some would go on leave in winter, while others would go in summer, particularly since this has also been specified in an official order. Practical experience has confirmed the correctness of this solution. Practical experience has also shown the importance of initiative. In the final analysis the regiment has seen savings in aircraft use and fuel consumption, and there has been an improvement in the quality of getting pilots returning from leave back on operational status, as well as improved pilot psychological stability.

In the past pilots as a rule were left to their own devices immediately preceding a training sortie. Now the last 15 to 20 minutes before departure are used for psychological reinforcement and self-relaxation. The pilot psychological relaxation room contains everything necessary for relaxation: soft sofas, armchairs, and a fireplace. The room contains an aquarium and a birdcage. A soothing voice can be heard: "I am here to fly. All my joys, sorrows, and problems have been left at home. I am well prepared for flight operations...." This message is recorded on tape and played from the flight surgeon's office.

I once asked regimental flight surgeon officer B. Zhdanov whether such sessions were beneficial. He replied in the affirmative. I also talked with the pilots. All of them expressed the desire to continue the sessions, which had become essential for them in readying for flight operations.

"Following psychological reinforcement and self-relaxation," one of the officers said, "we feel an influx of good spirits and energy, and we feel more work-efficient and fit."

Matters connected with flight personnel study of aircraft and aircraft equipment, aerodynamics, tactics, as well as with further improvement of moral-psychological training of combat pilots are periodically discussed at party committee meetings. Party committee members back up decisions with organizational work and work hard to achieve high end results. When it was necessary, for example, to step up party-political work in flight operations, party activists went to work in a close-knit manner, focusing other party members on this task as well. They placed emphasis on ensuring that party influence on Air Force personnel was exerted in a continuous manner.

In order to get flight personnel into a mood conducive to successful mission performance and strict observance of flight safety rules and procedures, the regimental morale officer or one of the political workers gives short talks immediately following preflight briefings. The topics addressed are of the most current relevance and are always tied in with current affairs and training mission tasks. A great variety of literature is extensively utilized in the regiment, such as "Spravochnik po Velikoy Otechestvennoy Voiny 1941-1945 gg." [Reference Handbook on the Great Patriotic War, 1941-1945], in which combat operations are calendar-listed literally in a day-by-day breakdown, as well as "Serviceman's Calendar," newspaper and magazine articles on a specific topic.

More attention is now being devoted to refurbishing visual agitation, particularly the "Ideological Work Bulletin." It lists activist tasks for a specified period of personnel combat training and discusses the results of performance evaluations, inspections, as well as the most important aspects of flight safety.

In present-day conditions mastery of combat equipment in my opinion requires particularly rigorous observance of flight safety rules and procedures and consideration of a number of specific features. I believe that it is time to grasp the fact that today, when military-strategic parity with the West has been attained, victory in modern combat will evidently depend to a significant degree on the human factor and the ability fully to utilize the combat capabilities of equipment, while observing a high level of flight operations safety. Unfortunately objective data presently indicate only a slow decline in the mishap rate, which is causing appreciable harm to combat readiness. More effective preventive measures in the area of flight safety are essential.

Many various instructions, directives, and orders have been issued on this problem.... But if flight safety were to be considered as a unique separate training subject and were to be studied not at the level of telegrams or instructions sent down from the higher echelon but as is

done, for example, in the Marxist-Leninist training system or in classes on aerodynamics? Then people would treat it more seriously, varying interpretations of certain guideline documents would be eliminated, and "cavalry charges" in carrying out the demands of such documents would become a thing of the past.

Why not introduce the position of flight safety officer at the regimental level? I believe that if such an officer properly analyzed the actions of each airman, synthesized his observations and immediately presented needed recommendations, the personal elements of the "threshold of safety" would be substantially increased.

At a regimental command element party meeting, during a discussion of the state of flight safety, party members officers V. Tamarovskiy, B. Titarenko and others sharply addressed the question of activating the human factor in this important area. Their approach is different, but their suggestions in general boiled down to the following: a radical restructuring of thinking is needed. And besides, why, for example, should party-member aviation engineer service supervisors not show greater initiative in predicting the level of flight safety? After all, there are capabilities to do this, but nobody is taking the initiative to do so. They should.

The campaign for mishap-free operations demands of Communists a differentiated approach. Everybody knows everything or almost everything about one another: who rested prior to flight operations and how, who is worried about what, and what problems are bothering a person at a given moment. It would also not be a bad idea to keep an eye on the family microclimate. Unquestionably this is a delicate matter and people's personal business to a greater extent. But helping a pilot hold his character and personality in check and teaching self-control in a stress situation within the family means reducing the probability of occurrence of accident situations in the air through the fault of the pilot. In short it is simply essential to motivate him to govern and control his own actions, to activate his will, and to suppress negative emotions. And comrades and colleagues should play an important role in this.

Maintaining and developing healthy morale and a healthy psychological, moral atmosphere among Air Force personnel, our party organization places emphasis on working directly with individuals. The main thing is attention toward an individual and his job. Much here depends on organizational work. Working in close contact with the commanding officer, maintaining high-principled demandingness, and supported by the collective intellect and experience, the party committee has appreciably increased its influence on the process of combat training and indoctrination of personnel.

How did we set about to achieve this? First of all, by increasing the responsibility of leader-Communists—commanders, political workers, and aviation engineer service specialist personnel—for their assigned area.

Secondly, by improving political indoctrination work in the squadrons and flights. Thirdly, by ensuring exemplary performance by Communists and Komsomol members in flight activities and in observance of established flight safety rules and procedures. We became convinced that success in activating the human factor cannot be achieved if one does not properly organize collective efforts by party activists. There should be no "honorary members" on a party committee; each member should be responsible for a specific job.

We must frankly admit, however, that there are many unresolved problems in our regiment, and this means that they are problems of the party committee as well. For example, how should we organize flight operations when there is a shortage of lower-rank specialist personnel? How can we fully reveal air near-mishap situations? It is no secret that if a squadron commander formally records all near-mishap incidents, he has a greater chance of falling into disgrace. And does it not have a disturbing effect on operations when it is necessary to take people away from preflight preparations in order to police the area or for other administrative and house-keeping activities?

We are justified in viewing the unabating flood of various documents as a legacy of the period of stagnation. I feel that some of them simply hinder efforts to achieve success in improving flight safety. Once party committee secretary officer G. Ukhin complained that party members had a poor knowledge of guideline documents on flight safety. We asked ourselves why this was. It was determined that too many of these documents were coming to the regiment. And yet their contents were almost identical: strengthen this, eliminate that, secure the other.... They were also written up in such a manner that sometimes they were difficult to assimilate and remember. But the main thing was that we had not yet restructured ourselves in working with them. It was necessary to shift from passive (communication, display in visual agitation materials) to more active forms of working with them—tests, practical demonstrations, and drills. And if the party committee and party buro would hold more strictly to account for failure to observe prescribed instructions, they will unquestionably enjoy greater prestige and respect.

I believe that the party committee should continue seeking new approaches for resolving the complex problems of flight safety. Implementation of valuable suggestions by party members and their active assistance will ensure appropriate priority attention to mishap-free flight operations not merely in words but in deeds. The decisions of the 19th All-Union Party Conference pledge us to do precisely this.

Aircraft Overhaul Depots Change Over to Direct Dealings With Air Forces Combined Units
91440073k Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 30-31

[Article, published under the heading "Economic Reform in Action," by Col N. Karasev, doctor of economic sciences: "Government Order or Government Dictate?"; first three paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] A radical economic reform is in progress in this country. In the assessment of the February (1988) CPSU Central Committee Plenum it has articulated many new problems, including ideological, which require study and resolution. Universal economics education is actively in progress in all agencies, establishments, organizations, and enterprises. As of 1989 enterprises and scientific research establishments of the Air Forces will transition to conditions of full economic accountability and self-financing, which unquestionably will affect the activities of military units and combined units.

This journal is continuing publication of a series of materials dealing with issues of the radical economic reform. The first of these articles was entitled "Radical Reform of Economic Management" (No 12, 1987). The article below deals with problems of Air Forces overhaul depots.

The editors request that readers send in interesting questions connected with practical implementation of the economic reform.

Many link changeover to the new conditions of operations by enterprises of the USSR Ministry of Defense, including Air Forces overhaul depots, with utilization of the government procurement contract order. Frequently the government procurement order is viewed simultaneously as one of the most important symbols of the new economic management and the main limiting factor in adoption of full cost accountability and self-financing at military plants. What is the problem here?

There is a widespread view that production at enterprises of the USSR Ministry of Defense, even under the new conditions, should be fully or partially regulated by government procurement contract orders. It is believed that since a government procurement contract order is mandatory for inclusion in the production plan, it takes on the form of a "government command," which leaves no independence whatsoever to the enterprises.

This situation is explained in large measure by the fact that initial experience in issuing government procurement contract orders within the framework of drawing up the State Plan for National Economic and Social Development for 1988 has proven to be far from the

demands advanced by the June (1987) CPSU Central Committee Plenum. In the first place, a government procurement contract order would be issued not for specific goods but for the goods produced by consolidated groups. Therefore in many instances enterprises did not receive an order for a specific item but rather the assignment to produce a certain volume of goods.

Secondly, the client procurement agency at the present time bears no economic liability to the executing organization, although the latter is operating on the basis of full economic accountability and self-financing. This is connected with the fact that government procurement contract orders are let by ministries and other agencies. In this case there occurs a violation of a demand stated by the June (1987) CPSU Central Committee Plenum: the basis of an enterprise's production and sales plan should not be a large number of detailed plan tasks determined in directive fashion by higher-level agencies, but rather an order placed by the direct user entity.

Thirdly, priority-status conditions and preferential terms were not provided for the government procurement contract order. The fact is, it is pointless to talk about preferential terms for a government procurement contract order as long as it encompasses the overwhelming bulk of goods produced. Simple logic states that there is no need at all to include in a government procurement contract order those types and volumes of goods for which the direct consumer entities place their own orders and the manufacture of which is profitable to the enterprise.

Fourth, due to the absence of a genuine capital goods market and economic competition between manufacturers for the customer, and also because the government procurement contract order encompassed almost all production, the idea of competition remains as yet unrealized.

The February (1988) CPSU Central Committee Plenum demanded that all these fundamental deficiencies be corrected when drawing up the State Economic and Social Development Plan for 1989. Therefore this task also currently faces Air Force overhaul depots, which in the coming year will be changing over to full economic accountability and self-financing. In implementing this task, the USSR Minister of Defense has demanded that governance by administrative fiat and excessively close supervision be resolutely eliminated and that the authorities of command personnel in utilizing the funds placed at their disposal be greatly broadened. Study of the practical problems arising in connection with the forthcoming changeover by aircraft overhaul depots to full economic accountability and self-financing shows the need for a fundamental restructuring of their economic relations. I believe that perestroika may prove effective on the basis of the following basic approaches.

First. Aircraft overhaul enterprises must change over to direct, long-term relations with Air Forces combined units in settling specific issues pertaining to overhaul and repair of combat equipment.

Implementation of this approach signifies for practical purposes that in the plan-covered period enterprises enter into regular commercial contracts to provide overhaul of aircraft directly with the corresponding Air Forces combined units. Funds for paying for overhaul and repair services would be placed at the disposal of combined unit commanders, who themselves would settle accounts with the overhaul depot. As a preliminary procedure, centralized arrangements would be made to assign overhaul depots and Air Forces combined units to one another for direct, long-term dealings. Commercial contracts entered into between combined units and overhaul depots should provide for mutual financial liability on the part of the contracting parties.

Officers V. Kostyuchenko, V. Ivanov, and others involved in aircraft overhaul speak in favor of this approach. They present a number of substantial arguments. First of all direct, long-term relations will unquestionably foster strengthening of daily interaction, mutual commitment and responsibility on the part of overhaul depots and combined units in all matters, not only pertaining to overhaul but also operation and maintenance of combat aircraft. This is an important condition for increasing the combat readiness of Air Forces units and combined units.

Realistic preconditions are also being created for decisively rooting out the practice of management by administrative fiat, for reducing the volume of accountability reporting, and for reducing the size of administrative staff and the cost of maintaining it, as is demanded by the CPSU Central Committee and USSR minister of defense.

In addition, there is a substantial increase in reliability of meeting overhaul schedules. When aircraft overhaul depots change over to full economic accountability and self-financing, this will become not simply a condition for their normal operation but the main foundation for observing the rigid requirements of full economic accountability, for under these conditions, if it fails to meet its overhaul schedule, a plant will be unable to generate even the requisite payroll, an issue which is persuasively addressed by Col L. Korolek, head of an aircraft overhaul depot.

With direct relations with overhaul depots, I believe commanders and engineers of Air Forces combined units should more rigorously plan the year's depot overhaul schedule, taking into account combat training schedules. The contractual agreement between depot and combined

unit could specify conditions connected with the occurrence of unscheduled combat training activities. The appropriate central agency could serve in this case as guarantor of observance of the interests of the contracting parties.

Another important element is the fact that establishment of direct, long-term relations between overhaul depots and Air Forces combined units is an essential economic foundation for implementing all other aspects of restructuring of management: adoption of a synthesizing indicator of sold product taking into account fulfillment of contractual agreements for delivery of goods, changeover to contracted wholesale prices, adoption of wholesale trade in means of production, etc.

Second. When aircraft overhaul depots change over to direct dealings with combined units, it will be necessary to place government procurement contract orders for overhaul as a rule only for performance of jobs connected with items not being delivered to the Air Forces.

This approach is in precise conformity with the requirements of the USSR Law on the State Enterprise (Association) and the USSR Gosplan enactment which states, in particular: "A state procurement contract order shall include only volumes of goods (work, services) intended primarily for delivery outside the precincts of the ministry or agency."

Third. It is essential to authorize aircraft overhaul depots to go directly to the component parts manufacturers so that they can settle for themselves the matter of supply. In scientific terms, this is a first form of wholesale trade in means of production, with the expansion of which the CPSU Central Committee links in large measure success of the radical economic reform. In this instance Air Forces central rear services agencies should place government procurement contract orders on behalf of the customer aircraft overhaul depots with the appropriate enterprises manufacturing the required means of production. Today this practice has begun to be adopted to a certain extent at a number Air Forces overhaul depots.

When drawing up a government procurement contract order on behalf of an overhaul depot, the requirement of the USSR Law on the State Enterprise (Association) which specifies mutual liability of the parties in establishing a government procurement contract order shall be fully observed, since actual contracting parties are involved, not legal entities with administrative jurisdiction.

With this approach the manufacturer has no other directive basis for forming a production plan and schedule other than a specific government procurement contract order received from the customer. This is especially important in present-day conditions, when enterprises have become empowered to draw up and approve their own production plans.

Centralized supply for overhaul depots can be retained only for that limited list of items which by virtue of specific reasons cannot be supplied by means of regular commercial dealings with the manufacturers.

Fourth. It would be advisable for Air Forces overhaul depots to select for practical application a first model of full economic accountability on the basis of self-financing. Economists are familiar with its content.

As is correctly emphasized by Maj V. Ivanov, chief economist at an overhaul depot, it is important thereby to speed up and simplify the procedure of cash transactions and settlement of accounts with the aircraft overhaul depot for repair and overhaul work performed, sharply reducing the excessive flow of documents. This requires using advanced, progressive methods of transaction adopted in the economy within the framework of the radical economic reform.

Fifth. Direct, long-term dealings demand and permit changing over primarily to contractual repair and overhaul prices, established by mutual agreements between overhaul depots and Air Forces combined units.

The expenditure method of establishing prices for repair and overhaul of combat aircraft prevails at the present time. Frequently there occurs "planned" overexpenditure of government funds.

I believe that in order to raise the level of scientific substantiation of contractual prices it would be useful to enlarge the grouping of expenditures forming the basis of the price for an overhaul, on the basis of more precise differentiation of degree of wear of equipment to be repaired or overhauled. It is important to ensure that both the overhaul depot and combined unit have material incentive to reduce the price of an overhaul by means of skilled utilization of economic standard amounts.

Thus an analysis conducted on the basis of study of specific practical items indicates that Air Forces overhaul depots, operating in strict conformity with the ideology of the radical economic reform, could march not in the rear guard but in the vanguard of restructuring of management of the economy. Not government procurement contract orders but rather commercial contracts with client organizations should and can become the planning foundation for their activities.

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Dangerous Helicopter Operating Conditions Described

914400731 Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 32-33

[Article, published under the heading "Flight Safety: Specialist Advice," by Lt Col A. Armash and Capt M. Golubev: "Helicopter Spontaneous Descent and Rotation"]

[Text] We know from practical experience of operating single-rotor helicopters that the probability of a safe

conclusion of a flight with simultaneous spontaneous descent and rotation is very small. This is due to the fact that in critical flight configurations a helicopter becomes virtually uncontrollable. Critical flight configurations develop most frequently with violation of established operating limitations. It is much easier to prevent the occurrence of such a hazard.

Unforeseen helicopter descent can occur when flying at less than minimum controllable airspeed or above maximum allowable airspeed for a given helicopter weight, altitude and air temperature. As these parameters increase, minimum controllable airspeed increases and maximum allowable airspeed decreases (Figure 1), in conformity with change in required and available engine power and rotor thrust.

When flying with change in gross weight, altitude profile, or crossing through air masses with different temperatures, the pilot should always assess the character of change in allowable airspeeds. Otherwise the helicopter may sink during maneuvering (acceleration, deceleration). This is particularly hazardous when flying over mountains with minimum terrain clearance as well as during landing approach to a high-mountain landing site. Therefore in order to avoid spontaneous helicopter descent it is essential to determine in advance the minimum airspeed at which level flight is possible with engines at maximum output, and subsequently not to reduce that speed. If a landing is to be made with a very steep landing approach in ground effect, the pilot should subsequently reduce airspeed at the moment he crosses the boundary of the landing area, at a height of 3-5 meters.

Spontaneous descent, especially of a loaded helicopter, can lead to a landing approach at excessive airspeed. If this happens, to effect intensive deceleration the pilot must substantially (more than 10-15 degrees) raise pitch angle. Rotor rpm increases sharply at high airspeed and large positive rotor angle of attack (with a simultaneous decrease in collective pitch). This is caused by a substantial increase in suction force on the blades with an increase of blade angles of attack less than critical. In this case the power required to turn the rotor decreases sharply (Figure 2).

To avoid rotor overspeeding, the engine automatic fuel feed control system reduces fuel flow into the combustion chamber, thus reducing available engine power right down to idle. Upon reaching the intended point of touchdown (initiation of hover prior to touchdown), the pilot moves the cyclic stick forward, establishing landing pitch angle, and by simultaneously increasing collective pitch, he reduces his rate of descent. If these control movements are executed sufficiently vigorously, the automatic engine controls, due to response delay, fail to provide the needed engine power to maintain rotor rpm constant. Rotor rpm and rotor thrust decrease, and the

Figure 1. Relationship between required and available rotor thrust and engine output on the one hand and airspeed, helicopter weight and altitude on the other.

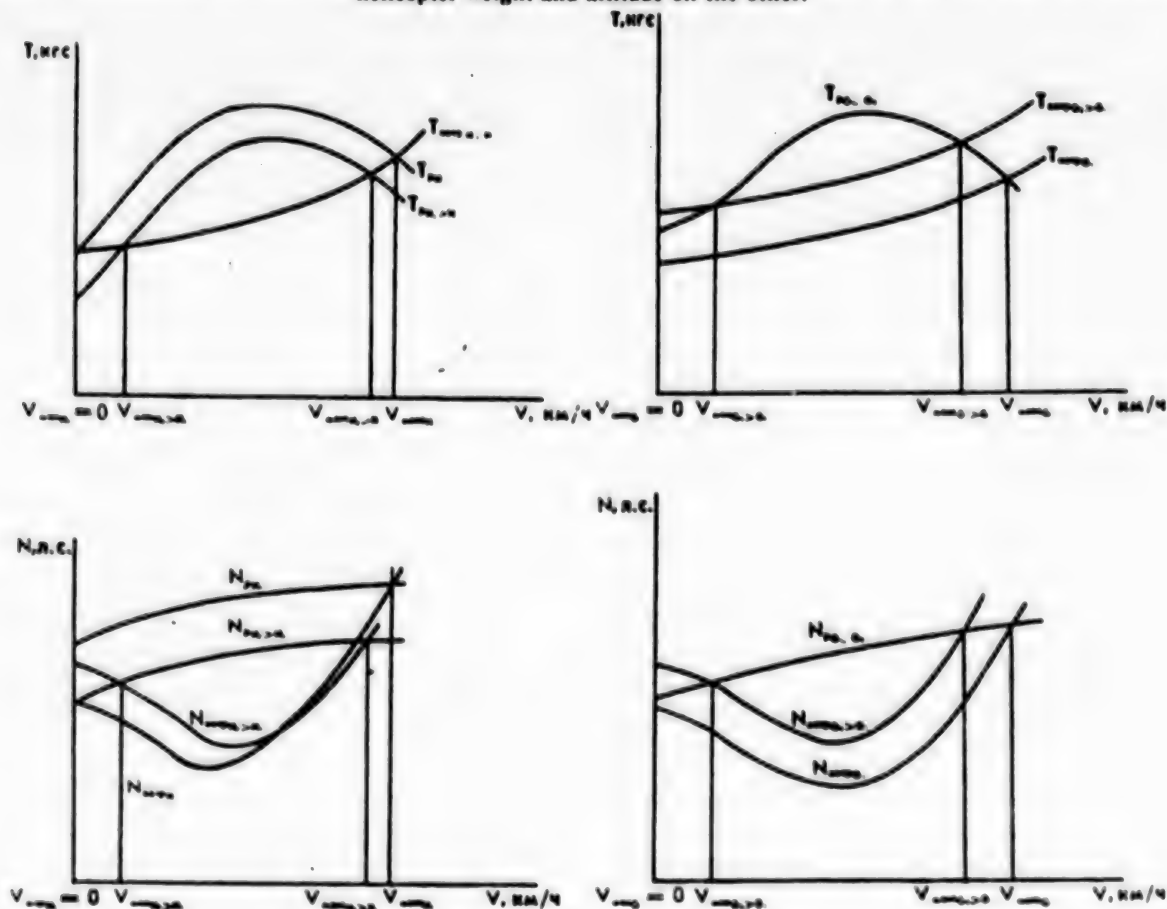
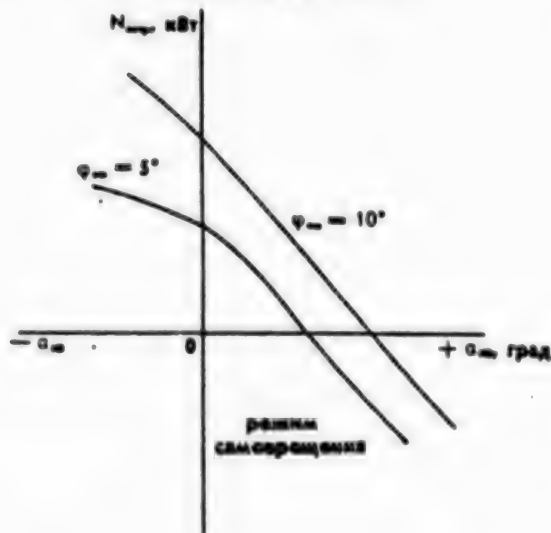


Figure 2. Relationship between power required for rotor rotation and angle of attack.



helicopter commences spontaneous descent. If this happens it is best to go around and fly another landing approach, this time observing the requisite flight parameters.

Practical helicopter operational experience has also shown other pilot errors which as a rule end in spontaneous descent: excessively loading the rotor at the moment of transition to acceleration following hover with engine operation in takeoff configuration, and a sharp increase in collective pitch during takeoff, landing, and during maneuvering without considering engine response.

It is important to note that decrease in rotor rpm unequivocally leads to decrease in rotor thrust. This is evident from the following rotor thrust formula: $T = C_t \rho R^4 n^2$, where C_t —rotor thrust coefficient; ρ —air density; R —rotor radius; n —rotor rpm.

A sudden drop in power applied to the rotor also promotes spontaneous descent, also causing a drop in

rotor rpm. This can happen when one or both engines fail, when surging occurs, or when foreign objects enter the engine intake.

There have also been cases of helicopter spontaneous descent during flight above fires (especially smoldering) and heat and electric power plant smokestacks. In the latter instance power loss occurs due to a rise in the temperature of the air entering the engine. A 25 degree C increase in air temperature leads to a 700-900 horsepower decrease in available engine power. It is therefore advisable to overfly such areas at economical cruise speed, that is at an airspeed at which margin of power is at a maximum and required required for level flight is minimal.

The pilot's principal task at the moment of onset of spontaneous descent due to drop in rotor rpm is to bring rpm back up by slightly reducing collective pitch, and subsequently to manipulate the controls in keeping with flight conditions and phase.

An analysis of incorrect pilot actions in certain instances of helicopter spontaneous descent revealed that the pilot, observing a drop in rotor rpm and an increased rate of descent, abruptly increases collective pitch, attempting to stop the helicopter from sinking. Such actions are extremely hazardous. First, if collective pitch is increased with a drop in rotor rpm, this will lead to an even greater increase in rate of descent, due to a more rapid rpm drop. Secondly, simultaneously with increase in collective pitch there is an increase in required torque M_t , and therefore rotor torque reaction as well (M_r): $M_t = M_r = 716.2 N_{prof}/n-r$, where N_{prof} —profile power output; $n-r$ —rotor rpm.

In this case this was caused by an increase in profile power N_{prof} required to turn the rotor blades and by a drop in rpm. Under the effect of steadily increasing rotor torque reaction, the helicopter begins turning to the left (with the normal direction of rotor rotation on Soviet helicopters). To prevent the onset of another critical condition—spontaneous rotation—the pilot applies right pedal by reflex action to increase tail rotor thrust. The pitch on the tail rotor blades (local angles of attack) is increased, which of course requires greater power needed to turn the tail rotor. But since the main rotor and tail rotor are rigidly coupled, the lacking power required to turn the tail rotor is taken from the power applied to turn the main rotor. Consequently main rotor and tail rotor rpm will drop off even more rapidly, and reactive moment will increase. The helicopter will begin to increase its angular speed of rotation on the main rotor axis and its rate of descent. Thus incorrect actions by the pilot to counter one set of critical spontaneous descent conditions can lead to the onset of another, no less dangerous set of conditions—spontaneous rotation.

How should the pilot manipulate the controls in order to avoid the occurrence of uncontrolled helicopter rotation?

During hovering, on the occurrence of the slightest tendency toward spontaneous turning to the left, the pilot must apply slight right pedal, while not increasing collective pitch. If the helicopter is already rotating on the main rotor axis (without descent) and it is impossible to stop this motion by applying right pedal, the pilot must decrease rotor reactive moment with an immediate but only slight decrease in collective pitch. If the helicopter's angular rate of rotation does not decrease, the pilot should smoothly, reducing collective pitch, increase rate of descent to 0.5-1 m/s and land the helicopter. If the helicopter has sufficient height (more than 200 meters), the pilot should put the ship into translational motion with a slip component, utilizing main-rotor autorotation.

During takeoff and landing the pilot should not increase collective pitch if the right foot pedal is close to the forward limit of travel. The right pedal should not be applied to its full limit of travel at any phase of flight, because this makes it impossible for the pilot to increase tail rotor thrust to balance M_r .

There sometimes occur cases of spontaneous rotation of a helicopter in hover with a right crosswind with a wind velocity above the maximum allowable. Tail rotor effectiveness to generate thrust drops off due to the onset of blade stall. Even a slight (especially on a heavily-loaded helicopter) forward movement of the right pedal leads to broadening of the stall zone, and therefore to even greater drop in tail rotor thrust and, as a result, to spontaneous rotation. Onset of spontaneous rotation during helicopter maneuvering is very dangerous.

Figure 3 shows an example of a SARPP-12 [flight data recorder] recording of uncontrolled helicopter motion arising when turning during an abrupt, steep climb. It is apparent that pitch and bank angles periodically change, reaching high amplitudes. Airspeed also varies across a broad range. Such a change in flight parameters is typical of spontaneous helicopter rotation with transition into an uncontrolled spin.

Thus in order to avoid entering dangerous, critical flight configurations, the physical causes of which are drop in main rotor rpm and decreased tail rotor effectiveness, the pilot should be familiar with and strictly adhere to the regulations and procedures as spelled out in the Helicopter Operating Limitations Manual.

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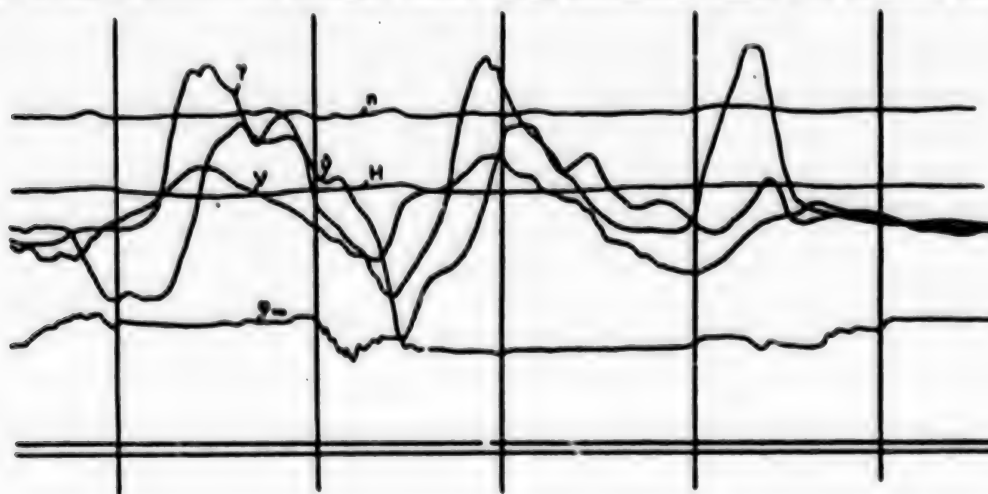
Israel, South Africa, Pakistan Accused of Nuclear Ambitions

91440073m Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 34-35

[Article, published under the heading "Imperialism—Enemy of Peace, Progress, Freedom" by Doctor of Technical Sciences Professor I. Panshin and Engineer I. Chernousko: "Nuclear Ambitions"; based on materials published in the foreign press; first three paragraphs and final paragraph are AVIATSIYA I KOSMONAVTIKA introduction, commentary]

[Text] "The press has reported that Israel has developed

Figure 3. Change in parameters of helicopter motion during spontaneous rotation with transition into a spin.



nuclear weapons. There have also been reports of secret projects conducted in the area of nuclear weapons development in other countries with reactionary regimes. Can you discuss these military preparations in greater detail? What threat do they present to the cause of peace?"

Capt A. Pentegov, military navigator. Sr Lt Yu. Tartynskiy, communications operator.

The following article is in response to these readers' questions.

...

"Tested in Combat Conditions"

Israel's Zionist ruling elite has reasons for seeking to obtain nuclear weapons. There are many reasons of a political nature. This aggressor state, a "strategic ally" of the United States for 40 years now, has been waging constant wars, has been carrying out acts of military provocation in the Near East, has been seizing the lands of others, and has been terrorizing the Arab peoples, especially the Palestinian people. Seeking to create a "greater Israel stretching from the Nile to the Euphrates," militant Zionists have been willing and continue to be willing to engage in any armed actions for the sake of achieving their sinister objectives.

Tel Aviv also possesses scientific and technical facilities for the development of nuclear weapons. The London Institute for Strategic Studies believes that the Israeli military surpasses even some NATO countries in basic armament categories, such as total number of medium tanks and combat aircraft. These include not only the latest U.S. aircraft but also modern arms of Israeli manufacture. It is noteworthy that in a country with a population of slightly more than 4 million more than 800

enterprises have been built (we emphasize—with the assistance of Western countries) which turn out at least 600 different armament items. And it is obvious that this disproportionately huge military potential is intended not at all for defense of Israeli territory. Two thirds of the Israeli Government's budget goes for military expenditures.

The aircraft industry, the electronics industry, as well as facilities for the manufacture of tanks and warships comprise the backbone of Israel's military industry. Building of the Kfir tactical fighter is in full swing. There is already an improved version of this aircraft—the Kfir-7—which is capable of carrying nuclear weapons. In 1990 the "ultramodern" Lavi fighter-bomber is scheduled to begin replacing this aircraft as well as U.S.-built Skyhawks and Phantoms in service with the Israeli Air Force. Washington has come to the aid of its "strategic ally" with a special appropriation of 450 million dollars for development of this aircraft. Another interested party, the Republic of South Africa, is also contributing to this project.

Israeli industry builds rockets and missiles of various types, including ones capable of carrying nuclear warheads: the Jericho operational-tactical surface-to-surface missile, with a range of 500 km; the Shafrir air-to-air missile, and the Gabriel antiship missile, with a range of up to 40 km. It has recently been reported by foreign wire services that Israel produces each year from 30 to 50 missiles with an effective range of up to 700 km.

The rulers in Tel Aviv, just as those in Washington, are active "merchants of death." They make no secret of the fact that they supply weapons (from aircraft and missiles to rifles and grenades) to the most odious dictatorships—to the Republic of South Africa, Chile, Paraguay, Honduras, Guatemala, El Salvador, Taiwan, and South

Korea. They export up to 2 billion dollars a year worth of arms to 52 different countries! These weapons are advertised as a rule as being "tested in combat conditions."

Thus Zionist export of military equipment and arms is not merely an activity of commerce or business but represents a policy hostile to the interests of peoples.

"Doomsday Weapon"

The idea of a "doomsday weapon"—this is what the Zionists call the atomic bomb, using a biblical expression—was long since entertained by Israel's reactionary regime. An atomic energy commission was formed in Israel as early as 1952. At that time they built their first atomic center, with U.S. assistance. They subsequently added two more. These facilities currently are operating three thermal reactors rated at 5000, 24,000, and 600,000 kilowatts. More than 250 novice nuclear scientists, engineers, and technicians are undergoing training overseas, for Washington has no secrets from Israel, which has obtained (just as the members of NATO) the status of "official ally" of the United States.

Israel resolves the problem of raw materials in its own "unique" style. The newspaper CHRISTIAN SCIENCE MONITOR stated that, pursuant to a secret agreement, the racist regime in the Republic of South Africa supplies uranium ore in exchange for arms and nuclear technology. There is also another way—theft. It is hard to believe, but this has been revealed to be fact: in 1968 the Israeli intelligence service Mossad, which has been implicated in a great many nefarious dealings, organized seizure of the ship "Scheersberg," which belonged to the international organization Euratom and was en route from Belgium to Italy. This vessel and its cargo (200 tons of enriched uranium) disappeared in the Mediterranean Sea and subsequently turned up in... Israel. Such machinations involving the acquisition of raw materials have been carried out with impunity by the Zionists in Great Britain, France, and the United States.

For example, with the assistance and connivance of the United States and its NATO partners, Tel Aviv began creating its own nuclear arsenal at a priority pace.

Fragmentary information on Israel's secret nuclear projects has been appearing in the press for years. It was reported at different times that Israel possessed 10, then 40, 100, and subsequently more than 200 bombs "ready for immediate combat employment." But the most sensational expose of the Tel Aviv fanciers of risky ventures was made by physicist M. Vanunu, who was employed for about 10 years in the Dimona underground nuclear center. He published in the British newspaper SUNDAY TIMES copies of secret documents and photographs attesting to Israel's dangerous "nuclear production" and its stake in weapons of mass destruction.

In spite of public opinion, a Jerusalem district court found M. Vanunu guilty of "treason," "espionage," and of disclosing "secrets pertaining to Israel's nuclear potential."

The following sensational report also surfaced. When the Israeli military was taking heavy casualties during the 1973 October War, then defense minister Moshe Dayan reported to Prime Minister Golda Meir in panic: "This is the end of Israel!" The aggressively-inclined Meir, according to the U.S. magazine TIME, ordered the "doomsday weapon" made ready. 13 hastily-assembled atomic bombs were delivered to waiting aircraft. But the situation on the battlefronts changed, and they were returned to the arsenals.

The UN General Assembly has condemned Israel for carrying out nuclear armament and has condemned the Western powers, the United States in particular, for giving Israel scientific-technical and financial assistance in these endeavors. Nevertheless Tel Aviv is continuing to produce "doomsday weapons," this time new, thermonuclear devices. The press also reports that Israel, jointly with the antipopular regimes in the Republic of South Africa and on Taiwan, is conducting research on the development of neutron and other warheads and cruise missiles with a range in excess of 2,000 km, capable of carrying nuclear warheads. And they possess the U.S. technology for building such missiles.

Israel's rulers have had no trouble obtaining nuclear weapons delivery platforms from the United States—300 Lance missiles, Skyhawk and Phantom aircraft, and are endeavoring to obtain Pershing missiles. But they themselves have also set up the manufacture of delivery platforms—the above-mentioned Jericho missiles and Kfir aircraft.

According to the Geneva magazine REVUE INTERNATIONALE DE DEFENSE, Tel Aviv has tested the improved Jericho II intermediate-range ballistic missile. It was launched from a point in the Mediterranean Sea and traveled 820 km. Its presumed maximum range is 1,450 km. Israel apparently already possesses from 50 to 100 nuclear warheads for this missile. Reports have also surfaced in the press that intensive work is in progress developing nuclear weapons employment methods at a secret test range in the desert. Thus words spoken by former Israeli Prime Minister David Ben-Gurion are coming true: "It is our task to develop as quickly as possible weapons which will not leave the slightest doubt in anybody's mind that we are capable of waging a devastating preventive war."

Dangerous Alliance

Satellites detected an unusually bright glow in the South Atlantic in September 1979 and in December 1980. The answer to the mysterious phenomena was soon revealed. It was ascertained that it was the result of joint experiments by Israel and South Africa involving testing

nuclear devices. They illuminated not only the "technical" aspects of the facts proper, but something more important—the ominous threat to peoples presented by the militarist alliance of two reactionary regimes, tacitly encouraged by NATO bosses.

Things began with a visit to the Republic of South Africa by Israeli physicists at the end of the 1970's, as a result of which Israeli specialists handed over nuclear technology to the South Africans. Construction of a plant to produce enriched uranium began near an operating nuclear installation north of Johannesburg, with Israeli and West German assistance. Soon a second nuclear center appeared. With Tel Aviv acting as a go-between, 136 tons of U.S. enriched uranium was handed over to the South African authorities, while the United States, the FRG and France provided them with two nuclear reactors capable of producing enough plutonium for several dozen bombs. A new-type Kuberg-1 reactor, purchased in Israel, is operating for the same purpose. We should add that more than 100 South African nuclear scientists, engineers, and technicians received training at U.S. laboratories.

Thus in the 1980's Pretoria commenced producing enriched uranium, suitable for the manufacture, according to the estimates of experts, of from 11 to 18, and in the future from 40 to 100 atomic bombs annually.

They also have delivery vehicles. These include missiles and 155 mm guns, as well as British-made Buccaneer and French Mirage aircraft, in service with South Africa's armed forces.

The apartheid regime is engaged in secret projects involving the construction of nuclear submarines and patrol craft to serve as launch platforms for cruise missiles with nuclear warheads.

Things do not end with the nuclear ambitions of these reactionary regimes. South African Army and Air Force specialists, adopting U.S. "experience" in Vietnam and Israel's most recent "experience," are working diligently on development of "ethnic" and "racial" weapons [ethnic or racially-specific chemical/biological weapons]. Such weapons are selective—harmless to whites and fatal to blacks and Arabs. U.S. recommendations are also being used in the development of binary weapons.

And Washington is gazing at all this with satisfaction. The imperialists across the ocean have a vested interest in a strong South African regime which would play the role of a watchdog guarding U.S. interests in Southern Africa. In addition, the United States has been obtaining uranium ore from South Africa for many years, which it used to establish its enormous nuclear potential.

"Islamic Bomb"

Pakistan is also doing its utmost to become a member of the "nuclear club," with the connivance and assistance of Western countries. And, what is notable, this

country's reactionary regime, just as Israel and South Africa, pursues a hostile policy toward its neighbors. This state became the principal base of operations for the undeclared war against Afghanistan, exerts pressure on India in an effort to force on it a pro-American orientation and, finally, serves as a base for U.S. rapid deployment forces.

The United States has continuously given military aid to the regime. In particular, this aid has included supplying F-16 aircraft, helicopters, etc. In addition Washington is transferring nuclear technology to Afghanistan, directly or indirectly, via NATO countries. The U.S. President, with feigned ingenuousness, literally stated that it is not such a bad thing if some country "has one or two bombs"; it is only important that this country "not threaten peace." But mankind will never forget the magnitude of tragedy for the residents of Hiroshima and Nagasaki from the fact that the United States possessed "only" two atomic bombs.

During the "cold war" years Washington sold Islamabad a 5000 kilowatt research reactor. Subsequently Canada provided a 125,000 kilowatt reactor. Nor did companies in the FRG, Great Britain, France, and other Western countries stand by idly. More than 130 Pakistani nuclear scientists, engineers, and technicians have been trained at U.S. nuclear centers. All this has led to a situation where a secret plant at Kahuta is enriching uranium to a grade suitable for use in nuclear devices. A second, more modern center is being built near the Pakistani capital.

At the beginning of the 1980's speculations were made in the foreign press that Pakistan has a capability to produce 4-5 atomic bombs annually. Experts at Georgetown University believe that by 1990 Pakistan will be capable of producing 20 nuclear warheads annually, and 60 by the year 2000. As for testing, judging from information reported abroad Islamabad has a contractual agreement to perform testing in Turkey or another "friendly" country. Pakistan also possesses the means of delivering the "Islamic bomb": U.S. F-16 aircraft and missiles transferred in past years to Pakistan by other countries. It is quite probable that to these missiles will be added intermediate-range missiles purchased by Islamabad from the West German company OTRAG.

The "Islamic bomb" is a genuine threat to peace. What we have here is a new attempt sharply to escalate tension in South and Southwest Asia, which affects the security of India, Afghanistan, the Soviet Union, and other countries.

Replenishing the "Powder Magazine"

Responding to our readers' questions, we shall note the following: Washington has already transformed Western Europe into a "powder magazine," deploying there a

colossal quantity of troops, arms, and nuclear munitions (more than 7,000 units). And the Bundeswehr, constituting NATO's principal striking force, has long dreamed of acquiring nuclear weapons and transforming the FRG into a nuclear power. A West German newspaper stated: "Today West German companies are already developing the technology to manufacture warhead components and are readying for production. Therefore one fine day the FRG may be transformed into a nuclear power."

In recent years the former Imperial German gunpowder plant at Hanau has begun to be turned into a nuclear industry center. Two large plutonium-enrichment facilities have been built; the enriched plutonium can be used for military purposes. In addition, the magazine STERN stunned its readers with the news that West Germany is in the process of preparing to build its own intermediate-range missile. A legitimate question arises: is West German militarism not seeking to compensate for the elimination of U.S. Pershing missiles and operational-tactical missiles, as specified in the treaty between the USSR and the United States, with West German-built missiles of the same classes? Nor is it mere happenstance that West German companies, engaged in active collaboration in the nuclear missile field with the above-named and other countries, are thus amassing their own scientific and technical know-how.

And what about Japan? While having proclaimed "three non-nuclear principles," Japan is constantly violating these principles, allowing the deployment of U.S. nuclear weapons on Japanese soil, permitting the basing on Japanese soil of U.S. aircraft which serve as nuclear weapons delivery platforms, and allowing port visits by ships of the U.S. Seventh Fleet carrying nuclear munitions on board. This is a rather strange position to be taken by the authorities of a country two cities of which were turned to ashes by a nuclear conflagration! And Japan itself, where nuclear power plants are being built and potent rocket and space hardware is being produced, may also amass experience and know-how in this area.

The nuclear preparations of the countries discussed above are taking place at a time when the Soviet Union, the socialist countries, as well as many other countries are seeking to accomplish the banning and elimination of weapons of mass destruction, when a treaty between the USSR and the United States calling for elimination of two classes of these weapons has been signed. The movement to declare nuclear-free zones is gathering momentum in many parts of the world—in Northern Europe, in the Balkans, and in the South Pacific, and many cities in a number of countries have already made such declarations. As we see, however, there remains a danger of employment of death-dealing weapons.

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Helicopter Maintenance Engineer Serves With Distinction in Afghanistan

91440073n Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 7, Jul 88 (Signed to press 3 Jun 88) pp 36-37

[Article, published under the heading "They Were Decorated by the Homeland," by Col V. Lebedev: "Wind-swept Airfield"]

[Text] The telephone rings from time to time in the small, austere-furnished duty officer's room. One or another of the aircraft maintenance engineers is called to the phone. He is asked for advice or consultation on some technical problem. Decisions are made on the spot, with precision and efficiency in the military manner. Frequently the name of Major Yakovlev would be heard. And on this occasion as well the airmen received additional evidence of his persistence, his engineering resourcefulness and ability to find a solution to what seemed to be a hopeless situation. Aleksandr Vladimirovich took most active part in correcting a problem on one of the helicopters. The aircraft was promptly returned to operational status.

During the first phase of perestroika the subunits' aviation engineer service supervisors exerted considerable effort to improve and speed up the supply of replacement parts and components. But the matter was not settled immediately or suddenly. Delays were occurring chiefly due to red tape involved in processing requisitions at higher echelons, as well as delay in shipment. Party member Yakovlev resolved to combat such red tape with everything at his disposal. He knows what a harmful effect an indifferent attitude toward providing the helicopter maintenance crews with replacement parts has on maintaining the equipment in a combat-ready state and on the morale of aviation engineer service personnel.

In order to be continuously current on the supply situation, Aleksandr Vladimirovich keeps detailed records. His notebook is filled with replacement schedules and timetables for specific components and assemblies. Separate entries indicate when a requisition should be submitted and where to turn in case of a problem. This helps him quickly gain his bearings and helps him make correct decisions in unforeseen situations.

The phone rang again. Major Yakovlev, after hearing the caller out, replied laconically and precisely: "We shall do everything we can to fulfill your request."

I noted ribbon bars on the officer's uniform jacket. His decorations included the Order of the Red Star and the Order for Service to the Homeland and the USSR Armed Forces, 3rd Class. I decided to get to know this officer better and to learn more about him. I wanted to trace Aleksandr Vladimirovich's engineering career and learn how he had come into military aviation and how he had earned his combat decorations.

Aleksandr Yakovlev was born in Bryansk Oblast, in the town of Novozybkov, where during the Civil War years a consolidated partisan detachment led by the legendary Nikolay Shchors smashed German interventionist forces. After graduating from high school Yakovlev enrolled at the Moscow Aviation Institute imeni Sergo Ordzhonikidze. Upon graduation he took employment at a scientific research institute. Soon he was called to service in the Soviet Army as a reserve officer. Upon completing his tour of duty, he submitted a formal request to his commanding officer to remain in the USSR Armed Forces. The young engineer's request was granted.

Aleksandr Vladimirovich served his first duty assignment as head of a technical maintenance unit inspection station. His process of development and maturation as a military man took place during this duty assignment.

From the very beginning his job involved combat helicopter maintenance. This officer conducted inspections and technical training drills knowledgeably and conscientiously, and he thoroughly studied and investigated the causes of various helicopter malfunctions.

As an aircraft maintenance engineer Yakovlev was clearly cognizant of the fact that he should master to perfection the art of scientific and technical analysis. The quality of mission performance by flight crews and flight safety depend on him in large measure. Aleksandr Vladimirovich adopted as a rule of action that any violation by subordinates of regulations and maintenance manual procedures pertaining to maintenance of combat equipment would be followed by a thorough investigation.

In the regiment in which Yakovlev began his military service they still remember the enthusiasm with which he conducted technical analysis sessions, how assiduously he prepared diagrams and graphs for these sessions, how conscientiously he selected his facts, and how effectively he utilized them in the training class process. Aleksandr Vladimirovich's men listened to him with interest and close attention. They would thank the engineer for his substantive and instructive critique and analysis of their performance during flight operations. At the same time these critique and analysis sessions served as a fine school for developing in the aviation engineer service maintenance personnel a high level of technical sophistication, flawless efficiency, and a love for their job.

This official worked on mastering methods skills with persistence and a high degree of diligence. In time, with the active assistance of his older comrades, he achieved appreciable success. Over a period of 10 years he showed himself to be a serious and knowledgeable specialist, a worthy bearer and continuer of the finest traditions of the engineer corps of our Air Forces.

He has not been in the service that long, but Aleksandr Vladimirovich had appreciably grown professionally. He completed a course of training at the Air Force Engineering Academy imeni N. Ye. Zhukovskiy. During his two years at the academy he refreshed and added to his knowledge of theory. His military-scientific and technical knowledgeability broadened, and he became more ideologically mature.

Upon graduation from the academy Yakovlev requested assignment to a remote region. He was sent to the Soviet Far East. At his new duty assignment, as regimental deputy commander for aviation engineer service, Aleksandr Vladimirovich did the work of two men, as they say. He endeavored to incorporate into the training and indoctrination process everything he knew and everything he had acquired during his study at the academy. It took this engineer considerable time to teach his men to think in the new way, to approach helicopter servicing and maintenance in an innovative manner. He did not harbor any illusions, knowing that not everything would go easily and simply. Nor were there any ready recipes for all situations which arose. Yakovlev understood one thing clearly: it was necessary resolutely and totally to eliminate excessive attention to form with consequent harm to content, and it was necessary to eliminate wasteful paper shuffling. Aleksandr Vladimirovich chose the airfield as his principal workplace. He was at the airfield from before sunup to sundown.

Here Yakovlev and his men readied the helicopters and, seeing them off, patiently waited for them to return to the field. It was here that this officer nurtured plans to refurbish the flight line area and reequip the training classrooms. The regimental deputy commander for aviation engineer service was concerned by the state of technical training as well as by instances of failure to follow prescribed work procedures. He wanted every training class to be hallmarked by profound theoretical content and to be preceded by thorough preparation.

Yakovlev concentrated his efforts on resolving urgent problems. Experience told him that he could not handle the entire job alone. It was important to enlist the support of the commanding officer, his deputies, headquarters staff, and the party organization. As head of the regiment's aviation engineer service, party member Yakovlev carefully studied the capabilities of his aides and heeded their opinion. He carefully weighed every suggestion received, discussed it with the men, and only then made a concrete decision.

His men appreciated this work style. They liked this engineer-leader's character traits of demandingness, initiative, and innovative approach to resolving complex technical matters. Aleksandr Vladimirovich did not shy away from a single urgent problem concerning aviation engineer service personnel. His responsiveness and closeness to the men inspired personnel and helped them

surmount difficulties with dignity. The regimental deputy commander for aviation engineer service also constantly worked with indoctrinating personnel. He skillfully utilized the men's excellent morale in the interests of the main task—maintaining the helicopters in a continuous state of combat readiness.

Party member Yakovlev also actively engaged in volunteer activities. He conscientiously carried out any party assignment. This engineer also worked on his own self-improvement, professional and intellectual growth, and regularly studied sociopolitical and specialized literature as well as military periodicals. The regimental deputy commander for aviation engineer service adopted the following habit: no matter how busy his workday, he always finds time for independent study of theory.

Two years passed. Yakovlev was faced with a new, tough test—a tour of duty with the limited Soviet forces in the Republic of Afghanistan. Here too he showed himself to be a fine aircraft maintenance engineer and a courageous officer-internationalist.

"Things were particularly difficult at first," recalls Major Yakovlev. "Intensive flight operations, mountain-and-desert terrain, sharp temperature fluctuations, and the 'Afghanets' winds [severe winds encountered in Afghanistan] caused a lot of problems. We had to replace components frequently and maintain extreme composure during servicing and maintenance of combat helicopters. But our maintenance personnel were well prepared psychologically for difficulties. For this reason, working in extreme conditions, and frequently under dushman [Afghan rebel] fire, they worked staunchly and selflessly, ignoring the danger."

Once while flying a mission the crew of an Mi-8 helicopter made a forced landing in the mountains at an elevation of 2,500 meters. Tail boom and tail boom extension, power train, primary reduction gearing, and engines were damaged. The commanding officer assigned the following mission to the aviation engineer service people: get the unserviceable helicopter back to the airfield and get it back into service with their own resources. They put together a team containing the most experienced and intrepid technicians and mechanics.

They had to operate under the most difficult conditions. A cold wind lashed their face and hands. But this did not keep the maintenance team, led by Maj Yu. Vovchenko, from successfully accomplishing the critical task. The combat helicopter was returned to service. Capts I. Lyskavets and L. Rusanov, Sr Lt V. Sudakov, and WOs Yu. Polezhayev and A. Timichev distinguished themselves during performance of this job. They displayed enormous composure, outstanding professional skill, and a high degree of tenacity.

On another occasion dushman fired on a Soviet helicopter as it was making a landing approach. They put bullet holes in the nose compartment. There was rotor blade

damage. There were onboard weapon malfunctions. But the combat helicopter did not remain long in the maintenance area. Aviation engineer service personnel returned it to service in record time.

The personnel under Major Yakovlev did a lot of other fine work in the course of carrying out their internationalist duty! Quite frequently Afghan military personnel would come to Aleksandr Vladimirovich's subunit with various problems. They might be looking for spare parts, or they might be seeking advice for solving a difficult technical problem.

Once the hydraulics system on one of the helicopters was damaged. The Afghans asked Soviet maintenance personnel to help correct the problem, and they complied. On another occasion they corrected a problem with the engine start system.

In a difficult combat environment under Afghan skies, Major Yakovlev successfully accomplished helicopter maintenance tasks working jointly with officers V. Kalinin, A. Yakovenko, V. Vilkov, and other colleagues. The result was losses of combat equipment being kept to a minimum. Even under these conditions Aleksandr Vladimirovich regularly organized training classes to study the complex helicopter systems and painstakingly worked to synthesize advanced know-how in helicopter maintenance on mountain-and-desert terrain. He adopted the finest know-how and incorporated it into practical aviation engineer service activities.

Here in Afghanistan this officer had demonstrated once again that he was right in choosing the profession of aircraft maintenance engineer. This is confirmed by his military exploits and combat decorations.

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Problems of Reserve Officers Trained at Civilian Schools

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[Article, published under the heading "Problems of Development of Young Officers," by Maj L. Mrochko: "Too Many Cooks...."]

[Text] At the training center of the department of military science at the Moscow Power Engineering Institute, students wearing coveralls walked past aircraft lined up along the ramp. Some of the students headed for the aircraft engine classroom, while others headed for the power systems and avionics classrooms. Senior O. Vikhlyantsev was in a simulator cockpit in one of the classrooms. Working on a class assignment, he is improving his aircraft maintenance skills. His strong interest in the training classes, just as that of his friends, is due to the fact that all the equipment is actually working equipment. Here one can put oneself to the practical test.

Lt Col Yu. Lyman, head of the training center, spoke with pride about his facility, but he did not hide a feeling of concern.

"Our department is equipped with everything it needs, but the students study equipment with models which are already being retired from service. Of course the aircraft differ little in design, but as far as equipment is concerned.... The boys subsequently have to retrain."

The problems connected with improving the training of aircraft maintenance specialists unquestionably must be resolved. The fact is that training facilities in the military science department are still somewhat weak, although the administration is planning to set up specialized laboratories where full-scale training classes on servicing and maintenance of aircraft can be conducted, as well as routine inspection, servicing and maintenance procedures.

Of course the officers are not sitting around twiddling their thumbs. A fleet of combat aircraft has been assembled at the training center, and a small garage and POL storage facility have been built. They have set up training classrooms with their own resources. There are classrooms in which the future reserve officers acquire skills in spotting and correcting malfunctions, using computers and other devices designed and built by instructors and students.

A great deal remains to be done, however, to organize the training process at an adequate level, and first and foremost it is necessary to obtain a sufficient quantity of modern aircraft equipment.

Of course logistic supply of college military science departments is no simple matter. And it would be hardly advisable to supply every department with costly modern equipment. Perhaps in large cities, where higher educational institutions train aircraft maintenance personnel for Air Forces units, consolidated specialized centers should be established, with substantial training facilities and resources. These centers could, taking into account the specific features of operations of the military science departments, provide everything necessary for training military aviation personnel. The prerequisites for this exist. For example, right now the military science departments of three higher educational institutions are using the services of the Moscow Power Engineering Institute's training center on a contractual basis. In addition, other military science departments at higher educational institutions where aviation specialist personnel are trained are willing to take part in establishing an interschool training center.

This idea has been expressed repeatedly by the head of the department, Doctor of Technical Sciences Col Ye. Barzilovich, in conversations with representatives of the various agencies with administrative jurisdiction over the military science department. Some of them, including the Air Forces command authorities, have promised

various assistance, while others, in particular representatives of the USSR State Committee for Public Education, advised him not to proceed hastily, suggesting that everything be carefully weighed and discussed. Apparently a wait-and-see position is more convenient to the committee, but it fails to solve the problem.

What is the problem? At the present time logistics support and direction of the institute's military science department are handled by the Higher Educational Institutions Administration of the USSR State Committee for Public Education and the Ministry of Defense. The two-agency administrative jurisdiction affects all aspects of the department's activities.

The majority of the department's officers, for example, take part in scientific research work. They maintain close contacts with line units and promptly fill their requests. The instruments developed in the department's laboratories have been placed on aircraft of several types. As a rule all research projects results evoke positive responses. Financial reward for research work done by these officers would be a fine incentive promoting development of scientific, efficiency innovation and invention activity. But for some reason payment of monetary reward is not prescribed for these officers, contrary to the practice in the institute's other departments. Why is this? It is simply not financially advantageous for someone to pay for development projects based on line-unit orders.

There is also another effect from two-agency administrative jurisdiction. In the last academic year, for example, many students who were discharged military personnel returning to the institute after completing their military service failed their courses and flunked out of school. Naturally, for various reasons. One of the reasons is that many served in the military in a job other than their military occupational specialty and lost their earlier-acquired knowledge and skills.

I feel that students inducted into the Armed Forces should serve in Air Forces units and acquire military occupational specialties which are related to those they studied in the military science department. This will enable them better to master aircraft equipment and acquire skills in maintenance of that equipment. Following military service the young men will be able to become readjusted more rapidly to the academic process and do a better job of mastering complex technical subjects. The benefit from such a resolution of the problem is unquestioned. Unfortunately this matter has not yet been settled.

Military commissariat officials blame the process of conscript allocation among the military services, which they claim cannot take such fine points into account. Of course there are objective reasons for this as well.

"The entire difficulty lies in the fact," stated city military commissariat spokesman N. Yermilov, "that selection of young men for assignment to the Air Forces is more rigorous, particularly as regards physical requirements. Many Moscow Power Engineering Institute students do not meet the requirements. The military science department should concern itself with the physical conditioning of its students." At the institute they are aware of this and are taking the necessary steps. A sports facility and an obstacle course are being built. But establishment of the large interschool center will make it possible to train students in conditions approximating actual conditions in line units, will make it possible to provide comprehensive standard servicing and maintenance of aircraft equipment, as well as handling many matters pertaining to psychological and physical training of students.

Interagency obstacles in the way of training reserve officers also create difficulties in selection of students for service in the military after graduating from the institute. Many students, prior to completing studies at a higher educational institution, submit requests to be taken into the Armed Forces. Since the military needs students possessing solid job-related training, disciplined students with follow-through, the military science department approaches candidate selection with a strong sense of responsibility. Lt Col G. Sukesov, who is in charge of this area in the department, and the other officers thoroughly study the students' personal file and interview them. They frequently encounter attempts to "push through" into the military students who are barely making it in school and who fail to show adequate zeal or excellent moral qualities. Unwarrantedly flattering letters of recommendation are sometimes submitted. Why is this? Some administrators in the faculties hold a strange view: a substandard specialist is a burden in civilian employment but will somehow do just fine in the military.

Other devices are used in regard to conscientious students who have expressed the wish to serve in the Air Forces. Documents are submitted late for these students, efforts are made to talk them out of their decision, and there is held forth the promise of more prestigious positions at civilian-sector enterprises. Here is just one example. Higher educational institution senior A. Manturov, who had decided to become an officer, suddenly declared before the board that he had made a mistake in his choice and that he was in general a person who tended to become distracted and could make a mistake when performing aircraft servicing and maintenance procedures. It was later ascertained that they had simply found him a more prestigious position at a civilian-sector enterprise.

The above is no rarity in the handling of senior-year students. Unfortunately the military science department does not have a decisive voice in matters of distribution and allotment of specialist personnel. Nevertheless due credit must be given to the department's officers. Lt Col V. Novikov, Capt S. Lebedev and K. Likhin, and Sr Lt

V. Artemov work diligently training future reserve officers. The majority of the senior-year students selected by them for military service display upon entering the military solid knowledge and excellent skills in operation, servicing and maintenance of combat equipment. Some of them have chosen to make military aviation their career.

In the opinion of the officers, many wish to remain in the military, but.... The first job assignment with which higher educational institution graduates begin their military service is not a very prestigious one for their professional or military advancement. In the military specialist personnel with degrees frequently are assigned to a technician's job.

Capt K. Likhin began his military service as a technician. Things did not go that well at first. He was thinking about leaving the military, but subsequently succeeded in obtaining a flight-personnel job assignment. He began flying as a flight technician [(airborne) crew chief]. Things began to look up. This officer was now able to apply the knowledge he had acquired at college in the military science department. Of course the romance of flying as well as good career prospects also were contributing factors.

"Fairly recently I got together with graduates of the department," related Lt Col A. Shevchuk. "They spoke frankly and recalled the past. Many of them really liked military service but intended to be discharged into the reserves. It is not a very enticing prospect to remain a senior lieutenant right up until you retire from the military, they explain. Avionics maintenance group senior technician Lieutenant Svinarchuk, aviation regiment technical maintenance unit aircraft inspection and maintenance group technician Lieutenant Mashkov, aircraft technician [crew chief] Lieutenant Baranenko, and others complained about this.

Nor should one forget that officers lose their engineering skills when they hold a technician's job for an extended period of time, taking a step backward in their professional development. Probably a situation where graduates of higher educational institutions are still viewed as regular two-year conscripts, in the military just to serve out their compulsory military obligation, is also unwarranted from an economic standpoint.

Of course former civilian-school college students are inferior to graduates of service schools in areas such as general military training and military smartness of bearing and appearance. The department has a good deal of work to do in this area. As practical experience has shown, however, these shortcomings can be corrected. Within a year or two it is sometimes difficult to distinguish who is a regular cadre officer and who received his training in a civilian-school military science department. The main thing lies elsewhere: graduates of civilian

higher educational institutions have received good engineering training, in which they frequently are superior to the graduates of service schools. So why should the attitude toward them be different?

In the line units there are many non-engineer job positions being held by engineers. Might it not make sense to assign civilian college graduates to these positions, following some kind of qualification test, at least toward the end of their service obligation? This would give them the opportunity to see professional growth prospects, would give them greater confidence, and would compel them to give some thought to the question of whether they might not want to extend their military service.

Of course each job assignment should be determined taking into account the merits of a given officer. But it is the job of commanders and political workers to find where to apply an officer's knowledge and skills and to take a close look at an officer. If this practice were followed, the military would not lose people whom it needs very much.

The training of an aircraft maintenance specialist does not end within the walls of the higher educational institution and the military science department. His development continues in the line unit. Unfortunately practical scrutiny reveals many deficiencies here. What are they? What causes them? These questions are answered in part by the results of a study entitled "The Graduate," conducted by a department research team. The study has systematized observations and conclusions reached from interviews with graduates and commanders of subunits and units. The team has drawn up a good number of interesting recommendations for improving the training and indoctrination process.

Commanders and aviation engineer service supervisors of Air Forces units apparently also have a good number of comments on this subject. Unfortunately the people in the department know nothing about them. For some reason they were not tasked with compiling comments on the performance of institute graduates who are serving under these commanders and supervisors. But the officers in the military science department unquestionably need detailed reports on the job performance and degree of competence of their former charges. In this area also it is necessary to surmount interagency obstacles, both in people's minds and in actuality.

The military education science people feel that it is time to revise the very status of the consolidated military science department and the arrangement of its administrative jurisdiction and subordination within the structure of higher education.

It is paradoxical, but fact nevertheless, that the institute's military science department is under the administrative jurisdiction of seven different entities: the Higher Educational Institutions Administration of the USSR

State Committee for Public Education, the corresponding directorates of certain branches of service and combat arms, and the district directorate of preconscript and reservist military training and higher educational institutions.... And each of these agencies naturally issues its own instructions and orders and establishes different timetables and forms of execution. More precise determination is necessary here in order to avoid duplication. That branch of the Armed Forces for the specialization area of which reserve officers are being trained should have overall administrative jurisdiction over a department. This will make it possible to avoid many interagency obstacles which are presently hindering improvement of the curricular process, training and utilization of aircraft maintenance specialist personnel. At the present time the department is training reserve officers for various combat arms and service components in several specialization areas. Is this advisable? Since narrow military specialization is observed at service schools, it makes even less sense to scatter manpower and resources in a military science department. It would surely be better to form several specialized departments. There has been some experience in establishing such departments, such as at Moscow State University, for example. This experience should be studied.

Division of departments on the basis of specialization area of a branch of the Armed Forces will in part eliminate co-subordination to or co-jurisdiction by various administrative agencies, will simplify establishment of training facilities and supply, and will increase competence of direction and administration.

The military science department at the Moscow Power Engineering Institute is performing a task of national importance, training reserve officers with the obligation to join the ranks of defenders of the homeland at any time. And one should also approach the department's problems from the standpoint of the interests of the state.

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Training Benefits of Publicizing Both Successes and Failures Stressed

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[Article by Maj A. Volk: "Learning Not Only From Success"]

[Text] They would be doing live firings of missiles which were new to the men of this Air Forces unit. At a staff meeting the commanding officer discussed with ranking personnel the proposed candidates for the primary and alternate crew. The candidates included officers who were well prepared both in a professional and moral-psychological respect, socialist competition front-runners Gds Maj N. Proistin and A. Poryadnev, Gds Capts A. Shibonov, V. Putivtsev, and A. Serkov, and Gds Sr Lt N. Kuznetsov.

Preparation training began with thorough, purposeful study of weapons delivery method. They practiced determining size and identifying features of targets, range to targets, range from which to commence fire, they honed to a state of automatism skills in operating the complex gear and weapon systems, and they analyzed the most frequently occurring errors and methods of correcting various malfunctions. This served to relieve excessive stress and tension and made the airmen confident of success.

They worked on readying the aircraft with a strong sense of responsibility. The squadron's engineers and technicians, together with the aircraft crews, thoroughly inspected the equipment, spotted the slightest irregularities in its operation which could lead to an abnormal or emergency situation in the air, and brought the missile system to required operating parameter standards. Personnel did a competent job of readying the aircraft for flight operations.

Finally the long-awaited day arrived. Scenario instructions came in one after the other. The representative from higher headquarters ordered first a single missile readied for firing. From this moment on the entire burden of responsibility for accomplishing the mock combat mission rested on the shoulders of the primary aircrew. The entire regiment was counting on them.

The pre-mission nervousness was increasing minute by minute. Prior to takeoff the crew members checked and rechecked twice and three times the simplest cockpit checklist procedures.... But once airborne and on their way, they entered into the accustomed work rhythm.

The turn to final target heading.... With each passing second time seemed to compress into a tight spring of actions, which "unbent" only at the moment of missile release. Soon ground reported that the launch had been successful.

Subsequently other aircrews also successfully performed the assigned mission.

Preparation of the aircrews for the test on the air-to-ground range and performance of the live missile firings were reflected in an advanced know-how news leaflet. The unit's activists endeavored to reveal the very essence and substance of the experience, which brought definite benefit.

Unfortunately the work techniques and methods of vanguard performers are not always skillfully analyzed and publicized. For example, the experience of the aircraft commander of an excellent-rated aircrew in mastering equipment which was new to the men was synthesized and disseminated in one of the units. What are the performance leader's secrets? What distinguishes his work style? "First and foremost competence, a high degree of professionalism in his flying, boldness and willingness to assume responsibility, ability to formulate

a task and organize its successful accomplishment, thoroughly to analyze the reasons for and causes of problems with crew coordination, and to teach his men to see the phenomenon behind a fact and to operate in the new manner," we read in a typeset publicity sheet. General statements and unsubstantiated appeals, and conclusions and recommendations not backed up with examples. Such incompleteness of statement, lack of persuasiveness, and halfway measures are hardly likely to evoke response on the part of military aviation personnel.

All this suggests the thought that the experience and know-how of our vanguard performers continues to be publicized and disseminated in an unoriginal manner. First the pledges of specialist personnel are reported, subsequently results are reported, a little bit about the components of the achieved success, frequently in general terms, followed by appeals to emulate the performance leaders. And, other than figures and words of praise, no other evidence of their skill and expertise is brought forth.

Practical experience shows that the effectiveness of advanced know-how and the possibility of its repetition are determined first and foremost by a high degree of professionalism and the ability to penetrate into the genuine secrets of skill and expertise. And, what is of considerable importance in our opinion, effect is produced not only by positive experience and know-how (we have already become accustomed to this), but also analysis of deficiencies and the causes of negative phenomena. The saying that one learns from one's mistakes is nowhere so relevant as in aviation.

Publicizing the work methods used by Maj V. Kozlov, deputy commander of an Air Forces squadron, for example, activists examined a specific situation encountered by his men in the process of mastering methods and procedures of combat employment of an aircraft which was new to them, equipped with airborne components of a local radio navigation system (RSBN). The publicity sheet notes that at first they had problems with doing the final installation, tuning and adjustment procedures on the specialized equipment, and that there were problems with running the aircraft through equipment check flights after completing the adjustment and alignment procedures and on-range adjustment of bomb-sight/weapons aiming systems.

A properly prepared, precise plan and schedule of procedures to final-adjust the accuracy characteristics of the electronic equipment, pertaining to check flights for airborne testing of operation and interaction of specialized systems with the onboard gear at various ranges, at improvement of blind bombing methods, however, the advanced know-how materials tell us, enabled the airmen to accomplish the assigned tasks with honor. A large contribution to this was also made by the subunit's innovators. They submitted and incorporated more than 20 efficiency innovator suggestions in the process of

mastering an aircraft which was new to them. The essential points of the principal efficiency innovations were also described in the publicity leaflet.

But perhaps the main thing that distinguishes the leaflet publicizing the advanced work methods and techniques of Maj V. Kozlov is a genuinely serious analysis grounded on laying forth the experience in and know-how of creating in the subunit a psychological environment or, as it is generally called, a moral atmosphere which promotes prompt and timely discovery and subsequent prevention of incorrect airman actions. In the past there were instances where pilots in the subunit, for various reasons, failed to report serious malfunctions in equipment operation. Creation in the subunit of requisite conditions for objective, truthful reports and instilling of frankness and candor in the men helped increase the effectiveness of their labor and helped ensure flight safety.

One can draw a conclusion from acquaintance with the experience of the performance leaders: wherever constant concern is shown for cohesiveness of the collective, wherever each individual knows not only his own tasks but common goals as well, wherever there exists a spirit of strong responsibility for the assigned task, success will always be achieved. Nor could it be otherwise: deed honors man.

Publicized and disseminated advanced know-how should be directed precisely to the military airman, to his conscientiousness and to problems of organization of his labor, for he will work properly only when he is convinced that everything depends precisely on his personal efforts, when the example of the leader and the first grains of experience and know-how, sometimes amassed at the heavy cost of enormous risk and bitter losses, show realistic ways to achieve the objective.

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Tethered Orbital System Maneuvers Described

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[Article, published under the heading "Future of the Space Program," by Doctor of Technical Sciences V. Ivanov and A. Danilenko: "Maneuvers by Tethered Systems"]

[Text] In his "Dreams About Earth and Sky" K. E. Tsiolkovskiy presented the idea of using flexible cords to control the motion of interconnected space objects. Subsequently this idea experienced further development, for the employment of orbital tether systems can foster more efficient accomplishment of such scientific and economic tasks as probing the upper layers of the atmosphere, testing vehicles of new types, organizing global radio communications, and performing certain orbital maneuvers.

Total forces acting on connected space objects with a taut tether cable differ from those acting on the same space objects in free orbital flight. The additional tethered connection reaction forces which are generated can be used as control forces for orbital maneuvers. Such maneuvers can be executed both in a tethered state and in free orbital flight after disconnecting the tether system.

When a tethered system is deployed, the altitude of one of the tethered objects decreases, while that of the other necessarily increases. The average orbital angular velocity of both objects will be equal to the orbital angular velocity of the system's center of mass. This means that the descending object travels at lower velocity and the ascending object with greater velocity than that of the tethered system's center of mass. In other words one of the tethered objects executes a maneuver involving increasing altitude and velocity, while the other decreases altitude and velocity.

We shall examine orbital maneuvers of tethered objects with a fixed-length tether system and maneuvers directly from the system deployment point. In the former case it is assumed that the tether system is already operating, and at a certain phase it becomes necessary for the tethered objects to shift to new orbits or transition into descent trajectory to return to Earth. In the second instance the tether system is deployed specifically for the tethered objects to perform orbital maneuvers. In both cases the tether system is disconnected for the objects to function in their new orbits.

Many practical tasks can be performed with equilibrium steady-state tether system motion, that is, with constant system orientation in relation to the local vertical. In this case the upper tethered object moves in a circular orbit at an absolute velocity exceeding local circular velocity, while the lower object moves at a lesser circular velocity for its altitude. If the tether system is disconnected at a given moment, both objects will immediately shift into elliptical orbits. For the upper object the point of its separation will coincide with the perigee of its new orbit, and for the lower object—with the apogee. The parameters of the new orbits will be determined by the orbital altitude of the system's center of mass, the length of the tether cable, and the relation of the masses of the tethered objects.

We shall assume that the tether system consists of an orbital station (OS) and a tethered object (TO) which is designed to perform specific tasks, and that the mass of the OS is substantially greater than that of the TO. Then the orbit of the system's center of mass virtually coincides with the orbit of the OS, and deployment of the system will have negligible effect on change in the orbit of the OS. We shall characterize the parameters of the new orbit of the TO by its eccentricity e , its focal parameter p , as well as apogee altitude H_a and perigee altitude H_p .

Table 1

Hos, km	Переход на более высокую орбиту 1					
	$\begin{matrix} 3 \\ \text{параметры} \end{matrix}$ $\begin{matrix} L, \text{ km} \end{matrix}$	25	50	75	100	150
300	e	0,0113	0,0226	0,0341	0,0456	0,0689
	p, км	6779	6880	6983	7087	7299
	Ha, км	478	662	852	1048	1461
	Hp, км	325	350	375	400	450
500	e	0,0109	0,0220	0,0331	0,0443	0,0669
	p, км	6979	7080	7183	7287	7498
	Ha, км	678	861	1051	1246	1657
	Hp, км	525	550	575	600	650

Hos, km	Переход на более низкую орбиту или траекторию спуска 2					
	$\begin{matrix} 3 \\ \text{параметры} \end{matrix}$ $\begin{matrix} L, \text{ km} \end{matrix}$	25	50	75	100	150
300	e	0,0112	0,0223	0,0333	0,0443	0,0559
	p, км	6579	6480	6383	6287	6098
	Ha, км	275	250	225	200	150
	Hp, км	128	—	—	—	—
500	e	0,0109	0,0217	0,0324	0,0430	0,0640
	p, км	6779	6680	6583	6487	6298
	Ha, км	475	450	425	400	350
	Hp, км	328	161	—	—	—

Key:

1. Transition into higher orbit
2. Transition into lower orbit or descent trajectory
3. Parameters

Table 1 contains the values of these parameters with TO transition into a new orbit or into a descent trajectory for return to Earth in the case of orbital maneuvers from equilibrium steady-state motion, with tether cable length $L=25-150$ km, and two OS orbital altitude values— $Hos = 300$ km and $Hos = 500$ km.

With a TO transition maneuver into a higher orbit with an increase in L , values e , p , Ha , and Hp increase. The increase in eccentricity proves to be practically proportional to the increase in tether length. The altitude of the perigee of the new TO orbit increases precisely by value L in relation to Hos , while the increase in apogee altitude proves to be significantly greater and somewhat exceeds 7 times tether length. For example, for $Hos = 300$ km and $L = 100$ km, TO transition into a higher orbit is determined by value $Ha = 1,048$ km. With an increase in OS altitude by the same amount, values p , Ha , and Hp increase, while the eccentricity of the new TO orbit decreases somewhat.

In a TO transition maneuver into a lower orbit or a descent trajectory for return to Earth, eccentricity of the new orbit increases with an increase in tether length,

while values p , Ha , and Hp decrease. The TO new orbit apogee altitude decreases by value L in relation to Hos , while decrease in this orbit's perigee altitude Hp proves to be approximately equal to 7 times the length of the tether system. With tether length values exceeding some minimum value L_{min} , Hp may prove to be less than the altitude of the boundary of dense layers of atmosphere H_{atm} . In this case the TO executes a transition maneuver into an Earth return descent trajectory. L_{min} is determined by the boundary condition of TO transition into a descent trajectory, $Hp = H_{atm}$.

Table 2 contains values of tether system minimum length L_{min} to ensure TO transition into a descent trajectory for various values Hos at $H_{atm} = 100$ km. Tether system dimensions apparently prove to be entirely realistic for executing a descent-from-orbit maneuver. A tether length of 120 km is sufficient for a return to Earth from orbits up to 700 km in altitude.

The descent trajectory can be characterized by angular distance Φ from tether system disconnect point to TO entry into dense layers of atmosphere, and by velocity of

Table 2

Hos, km	200	250	300	400	500	600	800	1000
Dmin, km	14,4	21,7	29,1	44,1	59,3	74,7	106,4	139,0

entry Ven and angle of entry Theta-en into dense layers of atmosphere. Table 3 contains the values of these variables for two OS altitudes and three tether system length values.

The TO descends from orbit on low-angle trajectories with angles of entry into the atmosphere which are very small in absolute value. To decrease dispersion in the final phase of the descent, it is advisable somewhat to increase angles of entry into the atmosphere. TO angles of entry into the dense layers of atmosphere can be increased to 4 degrees by selecting optimal tether length.

The peculiarity of tether system motion in a steady state, when the TO is traveling in a circular orbit at a velocity different from circular velocity for the given altitude, can also be used for servicing maneuver on a string of space objects traveling in circular orbits. If the OS orbital altitude is less than that of the objects to be serviced, the TO will overtake the system's objects in sequence, one after the other. If the orbital altitude is greater, however, it will be the reverse: the objects to be serviced will overtake the TO. Relative velocity is determined by the orbital altitude of the objects to be serviced, Hob, and tether system length L. Relative velocity also decreases with a decrease in L. For Hob = 500 km, for example, a decrease in tether system length from 100 to 5 km leads to a decrease in relative velocity from 166 to 8.3 m/s. But time required to service four space objects increases thereby from 2 to 48 days.

Servicing space objects at zero relative velocity comprises a special case. This is possible with tether system oscillatory motion relative to a vertical equilibrium position. If the amplitude of TO oscillations is 60 degrees, at the moment the tether system passes the vertical position, TO absolute velocity corresponds to circular velocity for the given altitude. This is possible both with TO oscillations above and below the OS. Thus servicing of a system of space objects at zero relative

velocity is possible both from above and from below. At the moment of soft contact between the TO and an object to be serviced, unreeling of the tether cable connecting the OS and TO should commence. Duration of unreeling is determined by duration of companion flight by the TO and object to be serviced.

The above-described condition of tether system oscillations with an amplitude of 60 degrees can also be used for TO transition into a higher or lower circular orbit in relation to the OS.

We shall now proceed with a description of orbital maneuvers of tethered objects directly from the tether system deployment point. Rectilinear deployment trajectories merit maximum attention, where angle gamma between the OS local vertical and a line joining the station and the TO remains constant during the entire process of system deployment. Such rectilinear trajectories are stable when zero gamma 45 degrees.

In the case of tether system upward deployment, the TO moves away from the OS, remaining at all times above and behind the station. Therefore the tether cable reaction force has a component in the direction of TO motion. This component leads to an increase in TO absolute velocity. Thus TO altitude and velocity increase in the process of tether system deployment. If the tether system is disconnected at a certain moment, the TO will transition into a new, higher orbit, which we shall characterize by apogee altitude value Ha and perigee altitude value Hp.

During tether system deployment downward, in the process of movement away from the OS the TO remains at all times below and ahead of the station. The tether cable reaction force in this instance has a component in a direction opposite to TO motion. Therefore tether cable reaction decreases TO velocity. The process of such tether system deployment is accompanied by a

Table 3

Nos, km параметры L, km	300			500		
	Φ	V_{rel} , м/с	Θ_{rel}	Φ	V_{rel} , м/с	Θ_{rel}
50	90,9°	7855	-1,28°	133,9°	7972	-1,25°
100	48,2°	7740	-1,95°	91,8°	7864	-2,46°
150	27,1°	7622	-1,83°	64,2°	7755	-3,40°

Key:
1. Parameters

decrease in TO altitude with a simultaneous decrease in TO velocity. Tether system disconnect leads to TO transition into a new, lower orbit. If this orbit's perigee altitude H_p is less than the altitude of the boundary of dense layers of atmosphere H_{atm} , the TO will transition into a return-to-Earth descent trajectory.

The energy efficiency of tether cable systems for orbital maneuvers can be determined by the value of combined characteristic velocity V_e required to execute precisely the same maneuver with two maneuvering burns. In the case of the TO transitioning into a higher orbit following rectilinear deployment trajectories with a tether system with a length up to 100 km, with a change in angle γ from 65 to 10 degrees, quantity V_e increases from 37.4 to 212.4 m/s. The energy efficiency of the maneuver increases with an increase in tether system length. For example, for $H_{os} = 500$ km and $\gamma = 20$ degrees, an increase in tether system length from 25 to 150 km leads to an increase in equivalent characteristic velocity from 47.3 to 283.9 m/s. This means that with a TO mass equal, for example, to that of a Soyuz TM, more than 1,000 kg of fuel may be consumed to accomplish analogous maneuvers by conventional means. In view of the high cost of boosting each kilogram of payload into orbit, the calculated efficiency of orbital maneuvers with employment of tether systems can be considered fairly high.

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Safety Aspects of Prelaunch Readying of Energiya Booster

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in Russian No 7, Jul 88 (Signed to press 3 Jun 88) p 45

[Article, published under the heading "Readers Request," by Doctor of Technical Sciences Professor V. Karashtin: "Energiya Booster Prelaunch Preparations"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Following publication of the article "Energiya on the Launch Pad" (AVIATSIYA I KOSMONAVTIKA, No 10, 1987), specialists wrote in to ask why the article failed to mention some of the launch complex and space launch facility service systems operating in the process of readying the Energiya booster for launch. The editors received quite a few letters in response to this article. The following article has been prepared taking these comments into account.

One of the principal features of the process of readying the Energiya booster for launch is the occurrence of a large number of processes taking place simultaneously and precise synchronization of these processes. While in the fueling phase the automated launch complex control system allows some variation in the countdown procedure, from the moment of readying booster onboard

systems for launch primary control shifts to the mission control system's ground equipment, which cuts in several dozen minutes before launch and operates on a rigid timetable.

Launch preparation requires synchronized operation not only by the launch complex but by the other space launch facility ground systems as well. For example, it is essential reliably to provide the launch complex with electric power at the required power level. The design of launch complex systems generally incorporates capability to be hooked up simultaneously to two electrically independent power sources. This principle of redundancy was also employed in the launch complex power supply arrangement for the Energiya. The difficulty of providing two independent sources of power was caused by the unusually large power consumption requirement. Suffice it to say that consumed power would be sufficient to light up a large city. The task was successfully accomplished following execution of the requisite organizational-technical measures.

The first launch of any rocket, especially a rocket such as the Energiya booster, always requires the most accurate meteorological data. For this reason the space launch facility's meteorologists not only had to record weather data but also forecast launch day meteorological conditions both at the launch site and along the entire flight path during the boost phase.

The basic composition of launch complex systems and their interaction in the process of prelaunch preparations and launch have been described in another article (No 10, 1987). I shall discuss certain items which were not discussed in that article. One of them is Energiya booster prelaunch safety procedures. Its significance is defined by the fact that liquid hydrogen and oxygen—these two fuel components—are incompatible from a safety standpoint. For this reason design, engineering and organizational measures were adopted both on the booster and on the ground to prevent a mixture of these substances from forming. For example, hydrogen and oxygen vapor gas analyzers have been placed in the interior spaces and structures of the launch complex; these devices provide information for taking appropriate steps.

Low-inertia hydrogen and oxygen vapor gas analyzers were also placed in the interior spaces of the Energiya booster. If the alarm sounds, gaseous nitrogen is fed to that location, with flow determined by gas analyzer signal level.

The aggregate of these measures was tested in the process of experimentation preceding launch and demonstrated a high degree of effectiveness.

Another important element is real-time acquisition of information on parameters of the compressed-gas and hydraulic lines system. Three systems are employed to obtain this information. One remote-controlled system

provides capability continuously to monitor each specified parameter. This enables the engineers continuously to monitor the process of readying for launch, with documentation of the most important elements. Two other systems operate on the principle of documentation of monitored parameters with subsequent information processing. At the operator's option, however, these systems are capable of real-time processing and displaying information of interest.

Control, measurement and monitoring systems associated with the equipment involved in storing fuel components and the gases which pump them aboard the booster comprise a special category. They are based on a specially developed microprocessor with an algorithm of the functioning of these systems in memory. These systems also have the capability of stepping in and altering the countdown schedule during prelaunch preparations.

One distinctive feature of these systems is the fact that they contain integrated control and monitoring functions. Their graphic control displays are based on a static-dynamic principle, that is, operating elements are dynamically illuminated on the mosaic static control display of the entire prelaunch operations system in the process of operation. This enables the operator fairly precisely to trace the sequence of operations being performed. We should like to emphasize that all systems operate simultaneously and that synchronization of their operation in a single prelaunch countdown timetable is handled by the automated launch complex control system.

A TV monitoring system is very helpful in providing information to launch preparation supervisors. This system provides remote inspection capability to view practically any external assembly on the booster as well as the ground launch equipment components. This system's TV monitors are placed at almost all operator locations, and they provide display of those booster or ground equipment components which are of interest to the operator at a given moment.

This same system provides visual monitoring of withdrawal of ground equipment just prior to launch, engine ignition, and the initial segment of Energiya's flight.

These are additional aspects of prelaunch preparations with the new booster.

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Soviets Stress Military Aspects of U.S. Space Shuttle

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[Article, published under the heading "The Pentagon's Orbital Arsenal," by Lt Col A. Radov: "Military Aspects of the Space Shuttle Program"; based on materials published in the foreign press]

[Text] The history of man's assault on space is a history of a contest between two trends: on the one hand a striving to make space exploration and utilization of

space an arena of mutually beneficial cooperation, on the basis of equality, for the good of all mankind, while on the other hand we have attempts to transform this vanguard area of scientific and technological advance into a new arena of military rivalry and to extend the arms race into this domain. In practice the former trend has been unswervingly pursued by the Soviet Union, and the latter trend by the United States. The military thrust of the Space Shuttle Program evokes particular concern.

5 January 1972 is considered the official date of commencement of work on developing the Space Shuttle, when the U.S. President approved this NASA program, which had been coordinated with the Department of Defense.

What is the reason for the Pentagon's heightened interest in this project? The fact is that, in the opinion of U.S. military experts, the Space Shuttle will make it possible to accomplish a qualitative leap forward in the area of utilization of space for military purposes. It is viewed by the Pentagon first of all as an enabling means of deploying in orbit, servicing and maintaining on a regular basis new-generation military space systems, and in the second place it is considered as a means for accomplishing applied military missions. These include inspection of satellites in orbit, with the capability to make the decision to destroy a satellite or return it to Earth; servicing and maintenance of military space vehicles in orbit (routine maintenance or emergency repairs, refueling, placement of standby vehicles onto operational status); conduct of operational-level reconnaissance, and testing of experimental models of weapons in space and from space.

Regular space shuttle flights began in April 1981. In the next five years four orbital stages (Columbia, Challenger, Discovery, and Atlantis) flew 24 missions, during which nine military space vehicles were placed in orbit. Approximately 300 experiments were conducted, one third of which were conducted for the specific purposes of the U.S. Department of Defense and are of an applied military nature.

It is noteworthy that even before completing flight testing of the shuttle craft, the Pentagon commenced a group of experiments of a military nature, in the course of which they worked on estimating man's capabilities to conduct visual reconnaissance from space, imaging of the water and land surface with optical, infrared, and radar equipment for the detection of land surface, water surface and subsurface military targets, testing of infrared and ultraviolet equipment for monitoring space and detection of ballistic missile launches, search for and detection of objects in space and approaching such objects for the purpose of inspection.

On the first shuttle missions special attention was devoted to working out problems of inspecting space objects. During the second mission, for example, the shuttle crew worked on searching for space objects

against the background of the day-night boundary and worked on evaluation of capabilities to detect and photograph objects. On the third mission Columbia approached a KH-11 Keyhole optoelectronic surveillance satellite to evaluate the condition of the heat shielding of the orbital stage and to work out inspection techniques. Such activities were also included on the fourth mission, during which the crew sought to locate Soviet satellites of the Kosmos series and the final stage of the Soviet booster which had lifted Interkosmos 14 into orbit. Further work on surveillance hardware continued on subsequent missions.

Speaking about the significance of these items, U.S. Chief of Naval Operations Admiral J. Watkins noted that testing of the SIR-B radar on the 13th shuttle mission made it possible to "discover new phenomena of exceptional importance both for understanding the processes taking place in the ocean and for achieving greater concealment for U.S. submarines and for detecting submerged enemy submarines."

In the view of Pentagon spokesmen, the 11th, 14th and 20th shuttle missions are of exceptional interest from a military standpoint. During the 14th mission two communications satellites, which had been placed into faulty orbits during the 10th shuttle mission, were removed from orbit and returned to Earth for repairs and subsequent relaunch. The SMM scientific satellite, designed to study solar activity, and the U.S. Navy's Lisat 3 military communications satellite were repaired in orbit during the 11th and 20th missions.

Problems of refueling space vehicles in orbit were worked on during shuttle operational flights. U.S. experts claim that this will make it possible to increase operational capabilities, extend useful life and boost operational stability by a factor of 1.5-2, as well as substantially to reduce the cost of development and operation of orbital surveillance vehicles. Considerable attention was devoted to work on problems of assembling large structures in space, which could find extensive application in the performance of erection and installation activities on board a future orbital space station and in assembly of combat space platforms developed within the framework of SDI.

An important role is also assigned to shuttle craft in the SDI Program. They are to be used for advance experimental development of offensive space weaponry and for demonstrating the realistic capabilities of these weapons. In 1985 the Pentagon drew up a long-term (running up to the mid-1990's) program of experiments pertaining to development of means of discrimination and tracking of space targets and development of aiming systems for weapons to be used against such targets. For example, a target-discrimination neutral particle beam generator is scheduled for demonstration-testing at the beginning of the 1990's. The capabilities of laser devices for solving the problems of detecting in space targets of various types were to be demonstrated in 1987. An experiment

of this kind, utilizing a ground laser installation in the Hawaiian Islands, was conducted during the 18th shuttle mission. Active tracking of the shuttle craft by laser beam continued for 2 minutes and 30 seconds. The diameter of the laser beam was 6.3 mm at the ground, and 9 meters at the orbital stage's 370 kilometer altitude.

Not only accuracy characteristics of guidance and tracking results were to be obtained in the course of experimentation scheduled for 1987, but also reflected-beam energy data, which is extremely important both for designing space-based reflector mirrors and for the structure of laser weapons as a whole.

The Challenger disaster on 28 January 1986 affected subsequent development of U.S. space-related programs. According to a statement made by Lt Gen J. Abrahamson, head of SDI, the two-year delay in launches of manned spacecraft made it necessary to revise project priorities, to step up testbed and laboratory development of hardware, and to incorporate into the demonstration testing program those projects which were the furthest along from an engineering standpoint.

Resumption of shuttle flights is scheduled for August of this year. Drawing up of a program of experiments for future shuttle flights for all branches of the U.S. Armed Forces was virtually completed, however, at the end of 1987. The Pentagon intends to commence these experiments beginning in September 1988. They will be conducted against the background of actual field exercises, troop and naval maneuvers, military aircraft training flights and practice missile launches.

Seven out of 11 approved experiments will be done for the U.S. Air Force, and 2 each for the Navy and Army. They involve reconnaissance of ground targets by optical means, radar surveillance of theaters of naval operations, imaging of the wake signatures of surface combatants of various classes and of submerged SSBNs, observation of areas of field exercises and troop maneuvers from space for the purpose of determining the possibility of command and control of ground forces combat operations from space, space surveillance, conduct of reconnaissance to determine optimal routes of troop and equipment movement across rough terrain, coordinate tie-in of stationary and mobile ground targets and their deployment areas, determination of early detection of land-based and sea-based ballistic missile launches, as well as other missions.

The U.S. Department of Defense plans to conduct such experiments on a long-term basis. In particular, consideration is being given to the establishment of a special unit in one of the operating agencies of the U.S. Air Force to coordinate between the services and other agencies, including the National Security Agency and CIA, of operations with manned spacecraft, formation

and verification of execution of a program of experiments in space, and handling of personnel matters—organization of selection and training of military astronauts and other matters of an organizational nature.

These are plans of the U.S. military administrative authorities for the immediate future. There also exist long-term programs which are closely coordinated with plans to develop new transport and technical support means and robotic devices, permanent orbital stations and space command posts, combat platforms with laser and beam weapons, and military bases on the Moon. Military space doctrine and scenarios of combat operations in space are being developed, the structure of space commands is being improved, and there are plans for establishing space forces.

All this attests to the Pentagon's unswerving endeavor to transform space into a theater of military operations and to augment the existing triad of strategic offensive forces with offensive space-based weapons.

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Articles Not Translated From AVIATSIYA I KOSMONAVTIKA No 7, July 1988

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